

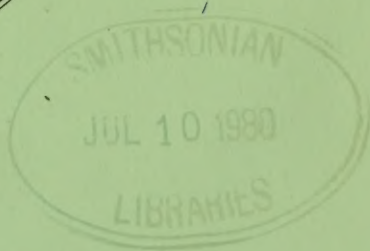


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Proceedings and Transactions of
The British Entomological and
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The society was founded in 1830 and is
now the largest and most influential
of its kind in the world.

Vol. 13
1880

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EDITORIAL

Our Council, as it reported at the 107th Annual General Meeting, (12 (3/4): 116) has been "trying to establish a happier *modus vivendi* with the Forestry Commission", following some members' complaints of trouble in obtaining permits to collect and of the limited scope of such, if obtainable. We reproduce, in the following pages, the Commission's reply to these representations. Here we must mention that, as on the occasion of the field meeting for the 2nd of June, other members seem satisfied with the arrangements and are grateful to the Commission.

The Council's report also mentioned the progress, towards enactment by Parliament, of a new Wild Life Conservation bill; at a later indoor meeting, the addition of the Essex Emerald moth to the list of lepidoptera to be protected in the schedule of the 1975 Act was explained (12 (3/4): 122).

There is more about these interrelated issues in the current double number, under the indoor meetings on 13th September and 11th October 1979. The Society's discussion of conservation policy seemed appropriately timed following the reported extinction in Britain of the large blue; the N.C.C.'s statement about this sad conclusion was made available to members at the first of these two meetings, and the debate on policy took place at the second. The discussion is summarised in the Proceedings, and in a letter, which we print following the Forestry Commission's letter. Perhaps our readers will contribute further letters to this debate, which has reached no conclusion yet. The question has also been raised in the pages of our contemporaries, for instance S.E.L.'s "Nota Lepidopterologica" (2: 67), and *Ent. Rec.*, 91 (10): 258.

One factor responsible for the increasing scarcity of some species and the extinction of others in Britain, is our unsuitable climate, against which a law is of no avail. Legislation directed against the individual or commercial collector is at least possible and at first sight seems, to many, a solution; moreover, the collectors have no lobby to protect their interests, as the real culprits undoubtedly have: — those farmers, builders, road-makers and public authorities who are bent on efficiency, improving, tidying up and spraying with insecticides the shrinking green places of our islands. However, a law against the collection of certain insects will prove harder to enforce than one to protect birds' eggs or wild flowers. Realisation of the difficulties may still moderate the bill's scope while it is not too late to avoid inaugurating a farce. Voluntary observance of the existing code is already normal among amateur insect collectors and promises to be a more rational approach to the problem.

THE 1979 ANNUAL EXHIBITION

(with Plates VIII and IX)

(for technical reasons, Pl. IX will appear later in the year)

The Society's Annual Exhibition was again held at Chelsea Old Town on the day immediately following the Annual Dinner, that is, on the 27th October. Considering the inclemency of 1979 and the consequent dearth of insects, the exhibits were surprisingly copious, though not all were the product of that year, of course. However, the number of exhibitors fell

below a hundred with about seventy exhibiting lepidoptera. The interest and quality of the exhibits showed no decline, and those arranging the refreshments again succeeded in giving perfect satisfaction to those in need of sustenance. The editor is much obliged to the sectional reporters: B. SKINNER, J. M. CHALMERS-HUNT, R. F. BRETHERTON, J. MUGGLETON, and A. E. STUBBS, for submitting their lists early in December, and to DAVID WILSON, for photographing and mounting once again the photos of the selected specimens for our plates.

BRITISH MACRO-LEPIDOPTERA

ALLEN, Dr. A. A. — *Mythimna putrescens* (Hübner) and *Agrotis trux lunigera* Steph. were included in a small selection of moths taken at Dawlish, South Devon during July and August 1979.

ARNOLD, R. — A halved gynandromorph of *Saturnia pavonia* (L.) bred in 1978. (Pl. IX, fig. 16).

BAKER, B. R. — An F2 generation of *Diaphora mendica* (Clerck) f. *rustica* (Hübner) having confluent spotting of both fore and hindwings and including several extreme rayed examples; bred from a normal female from Co. Limerick, Eire. A specimen of *Cosmia trapezina* (L.) ab. *nigra* Tutt taken on 10th August 1979 in Berkshire.

BANNER, Dr. J. V. — A bred series of *Furcula bicuspis* (Borkh.) from Devon.

BARTON, H. K. — A female specimen of the rare migrant *Chrysodeixis chalcites* (Esp.) taken at Knowle, near Bristol on 10th October 1979.

BLAND, K. P. — Single examples of *Melanchria persicariae* (L.) from Midlothian and *Pterapherapteryx sexalata* Retz.) from Kircudbrightshire; both species being uncommon in Scotland.

BRITISH MUSEUM (NATURAL HISTORY) and WILTSHIRE, E. P. — Distribution in Europe, and geographical variation, of the known races of *Photedes morrisii* (Dale). Four drawers of *Arctia caja* (L.) from the newly curated collection of British Arctiidae.

BRITTON, M. — Lepidoptera, taken or bred during 1979, including *Bomolocha crassalis* (F.) and *Chlorochlystis debiliata* (Hübner) from Pamber Forest, Hants. Also examples of *Orthosia populeti* (F.) taken at rest on boles and stems of aspen growing in Maidenhead Thicket, Berkshire.

CHALMERS-HUNT, J. M. — A female of the excessively rare albino form of *Maniola jurtina* (L.) from Magpie Bottom, Kent on 4th July 1979, (Plate IX, fig. 18).

COXEY, S. — Lepidoptera taken near Abergele, Clwyd including the following: — *Furcula bicuspis* (Borkh.), *Lithosia quadra* (L.), *Eugnorisma depuncta* (L.), *Oligia versicolor* (Borkh.), *Orthonama obstipata* (F.) and *Euphyia biangulata* (Haw.).

CRASKE, R. M. — Aberrant Rhopalocera taken or bred in 1979 and mainly from Sussex, including a male *Boloria selene* (D. : S.) having the basal areas of the hindwings confluent, and a variable series of both *Anthocharis cardamines* (L.) and *Pyronia tithonus britanniae* (Verity).

CRONIN, A. R. — Two cases of aberrations containing a darkly suffused *Crocallis elinguaris* (L.) taken in Sussex, July 1973, (Pl. IX, fig. 17).

DEMUTH, R. P., and GOATER, B. — A series of *Xestia alpicola* Zett., *alpina* (H. & W.) taken in 1979 from Moorhouse N.N.R., Cumbria.

DOBSON, A. H. — New Forest captures during 1978, including *Eupithecia irriguata* (Hübner) and *Aleucis distinctata* (H.-S.).

EDMUNDS, H. A. — A variable series of *Zygaena trifolii* Esp. from Hampshire and Devon. In 1978: — *Rhyacia simulans* (Hufn.) from the Cotswolds. *Rhodometra sacraria* (L.) and *Mythimna unipuncta* (Haw.) from Hampshire.

ELLIOT, B. — A varied series of *Noctua comes* Hubn. f. *curtisii* Newman from Morayshire. A melanic *Autographa gamma* L. taken in Derbyshire in 1979. A caught series of *Brachionycha nubeculosa* Esp. from the Scottish Highlands found by searching the trunks of Birch.

FENN, J. L. — A specimen of *Cossus cossus* L. from Hockwold, Norfolk. A bred series of *Catarhoe rubidata* D. & S. from Dorset and Cornwall. *Thalera fimbrialis* Hübn. bred from a female taken at Dungeness, Kent. Caught and bred specimens of *Acronicta menyanthidis* Esp. from King's Lynn, Norfolk taken from 1977-79.

FENSOME, B. D. — A selection of British Butterflies including a fine *Boloria selene* (D. & S.) with melanic hindwings. (Pl. VIII, fig. 3).

FRY, R. A. — The results of cross pairing *Smerinthus ocellata* (L.) with *Laothoe populi* (L.).

FURNELL, D. L. — Aberrant *Rhopalocera* including an extreme yellow variety of *Pieris rapae* (L.).

GANDY, M. — A male aberrant *Pyronia tithonus* (L.) with whitish ground colour from Cardiganshire on 1st August 1979.

HARBOTTLE, Rev. A. H. H. — *Cenonympha tullia davus* (F.) ab. *lanceolata* Arkle and ab. *impupillata* Lempke from Witherslack, Lancs.

HADLEY, M. — A female *Notodonta torva* (Hübner) taken at Eastbourne, Sussex on 24th May 1979. The second recorded capture for the British Isles. (Pl. VIII, fig. 4).

HARMER, A. S. — A bred variable series of *Lasiommata megera* (L.) from Portscatho, Cornwall; of particular interest was a female ab. *croesus* Staud. (P. VIII, fig. 5).

HAYWARD, R. — Local and aberrant lepidoptera taken mainly in 1979; these included a very dark specimen of *Alcis jubata* (Thun.) from Plymouth, S. Devon. (Pl. , fig.).

JENKIN, A. — A male *Clostera anachoreta* (D. & S.) taken at Dungeness, Kent in 1979.

LANGMAID, Dr. J. R. — Migrant Lepidoptera taken at Southsea, Hants. during October 1978 were *Mythimna vitellina* (Hübner), *Mythimna unipuncta* (Haw.), *Cyclophora puppillaria* (Hübner) and *Palpita unionalis* (Hübner).

LEACH, M. J. — Bred series of *Ectropis crepuscularia* D. & S. from Devon. *Egira conspicularis* (L.) from Hereford, and a female *Eupithecia abietaria* (Goeze) from the Forest of Dean, Gloucestershire, 6th July 1979; very few specimens of this elusive 'Pug' have been recorded in recent years.

LOCKER, W. — A bilateral gynandromorph of *Quercusia quercus* (L.).

MICHAELIS, H. N. — Heterocera from North Wales included *Melanthia procellata* (D. & S.), new to Caernarvonshire; and several *Euxoa obelisea grisea* (Tutt) from various localities in Caernarvonshire and Denbighshire.

OLIVER, G. H. B. — A varied series of *Cenonympha pamphilus* (L.) collected over many years.

PEARCE, C. F. — A mixed gynandromorph of *Erebia aethiops* (Esp.) from Morayshire on 14th August 1979. (Pl. VIII, fig. 6).

PICKLES, A. J., and C. T. — Local moths bred or captured during 1978 and 1979: — Bred *Catocala sponsa* (L.) and *C. promissa* (D. & S.) from the New Forest, and a female *Heterogena asella* (D. & S.) also from the New Forest.

PORTER, J. — The first British example of *Athetis hospes* (Esp.) taken in South Cornwall on 27th August 1978. (Pl. IX, fig. 12).

PRATT, C. — Sussex lepidoptera taken in 1979 included *Eilema caniola* (Hübner) and the extreme white form of *Gnophos obscuratus* (D. & S.).

REVELS, R. — Three drawers of *Lysandra coridon* (Poda), depicting great variation, and including a fine example of ab. *antidigitata* B. & L. (Pl. IX, fig. 15). Two drawers of *Melanargia galathea serena* Verity ab. *craskei* Tubbs bred over the past five years. (Pl. VIII, fig. 8).

RICHARDSON, N. A. — A selection of Heterocera from a previously under-recorded part of North Wales. These were taken between 1973-1976 and included *Idaea contiguaria britanniae* (Müll.), *Dasypolia templi* (Thun.), *Heliothis peltigera* (D. & S.), and *Rhodomestra sacraria* (L.).

RUSSWURM, A. D. A., and MIDDLETON, H. G. M. — Butterfly aberrations caught or bred in 1979 from Dorset and Hampshire. Of special note was a male *Inachis io* (L.) ab. *belisaria* Ober. (Pl. IX, fig. 19), and an extreme melanic male *Aglais uricae* (L.) (Pl. VIII, fig. 2), the result of temperature experiments.

SAMUELS, K. — Selected example of *Pieris napi* L. including a halved gynandromorph, and a small varied series of *Mimas tiliae* L.

SIMSON, Brig. E. C. L. — Variable series of *Angerona prunaria* (L.) bred from a female taken on the Society's field meeting at Botley Wood, Hants. on 2nd July 1978. A female specimen of the *Eupithecia* family emerging in March 1979, possibly from potted house-plants purchased in Hampshire, and which, despite critical examination by a number of experts, remains unidentified.

SKINNER, B. — A series of *Cyclophora puppillaria* (Hübner) bred from a female taken in Dorset in October 1978 and bred series of *Ectropis consonaria* (Hübner) ab. *nigra* Banks from West Kingdown, Kent.

SOKOLOFF, P. A. — Heterocera bred or captured during 1978, including *Mythimna unipuncta* (Haw.), *Rhodomestra sacraria* (L.) and *Eupithecia millefoliata* Röss. from North Kent.

STERLING, Col. D. H. — A specimen of *Tyria jacobaeae* (L.) ab. *coneyi* Watson, taken by M. J. Sterling in Oxford on 22nd June 1979.

TREMEWAN, W. G. — The following aberrations of British *Zygaena* taken during 1979: — A series of *Z. trifolii decreta* Verity including the very rare six-spotted form (Pl. IX, fig. 10), also confluent and yellow (ab. *lutescens* Cockerell) forms. A series of confluent *Z. trifolii palustrella* Verity including one ab. *lutescens* Cockerell. Several specimens of *Z. filipendulae anglicola* Tremewan including one orange ab. *aurantia* Tutt (Pl. IX, fig. 11), and one yellow ab. *flava* Robson.

TUBBS, M. — An extreme male *Lysandra coridon* (Poda) ab. *postfulvescens* B. & L. taken in Dorset in 1979.

TUBBS, R. S. — The results of breeding nine generations of *Lysandra coridon* (Poda) ab. *syngrapha* Kef. mixed with ab. *fowleri* Smith.

TYLER, D. B. — An extreme aberration of *Hipparchia semele* (L.) (Pl. VIII, fig. 1).

WILD, E. H. — Aberrant and local heterocera taken during 1979. These include two extreme forms of *Agrotis clavis* Hufn. from Surrey, and a melanic *Tetheella fluctuosa* (Hübner) from Kent.

WATSON, R. W. — A varied series of *Erebia aethiops* (Esp.) from Argyllshire including a bilateral gynandromorph. (Pl. IX, fig. 13). Examples of *Argynnis paphia* (L.), *Melitaea cinxia* (L.), (Pl. VIII, fig. 6), *Aglais*

urticae (L.), and *Inachis io* L. showing the effects of temperature experiments. A male *Hippotion celerio* (L.) taken in Hampshire on 10th November 1978. The continuation of the breeding of *Tyria jacobaeae* (L.) ab. *coneyi* Watson and its variants. A varied series of *Colotois pennaria* taken at m.v.l. in Hampshire in the autumn of 1978.

YOU DEN, G. H. — Two specimens of *Clostera anachoreta* (D. & S.) taken in Dover in 1951 and 1964, and another bred 114 years ago by Dr. G. Knaggs. Three specimens of *Euxoa cursoria* (Hufn.) from Dover, Kent; one in 1957 and two in 1979. A single example of *Cryphia muralis* (Forst.) taken at Dover on 6th August 1979.

YOUNG, L. D. — Six generations of aberrant *Lysandra bellargus* (Rott.) from Surrey stock. One example of particular interest is depicted on Plate IX, fig. 14.

BRITISH & FOREIGN MICRO-LEPIDOPTERA

AGASSIZ, Rev. D. J. L. — (1) Nymphuline moths newly introduced to Britain in 1978/79: *Nymphula manilensis* Hampson, *Parapoynx fluctuosalis* Z., *P. stagnalis* Z. and *Oligostigma polydecalis* Walker. All taken in aquatic nurseries in Enfield, Middlesex. (2) Native species taken or bred in 1979: *Eucosma pauperana* (Dup.), Cambridgeshire; *Nothris congressariella* (Bruand) and *Olethreutes lacunana* (D & S.), Scilly Isles; *Gelechia nigra* (Haw.) and *Agonopterix bipunctosa* (Curt.), Hampshire.

ALLEN, Dr. A. A. — *Parocystola acroxantha* Meyrick, Dawlish, Devon, ♀ captured 2.viii.79 at actinic light. Eight adults were captured 2-11.viii.79. The species is evidently well established in this area. *Mompha lacteella* (Stephens), Dawlish Cliffs, Devon, swept by *Epilobium hirsutum*, 28.vii.79. *Commophila aeneana* (Hbn.), Salfords, Surrey, one, 18.vi.79, of four such moths taken in mid-June. *Cochylidia rupicola* (Curtis), Dawlish Cliffs, Devon, one, 30.vii.79.

BLAND, Dr. K. P. — *Aphelia unitana* (Hbn.), Meg's Hill, Teviothead (O.S. NT/4002), Roxburghshire, larva on *Centaurea nigra*, 22.v.79, bred 11.vi.79. Not previously confirmed from Scotland. *Apotomis semifasciana* (Haw.), Nidgehope Marsh, Ettrick (O.S. NT/2714), Selkirkshire, at m.v.l., 3/4.viii.79. A very local species in Scotland. *Amphibatis incongruella* (Staint.), summit of Traprain Law, E. Lothian (O.S. NT/5774), case found 8.iv.79, imago emerged 12.iv.79. No heather growing in vicinity. Only previous record for Scotland is an old unconfirmed one for Aberdeenshire. *Cochylis flavicilliana* (West.), Easton Royal, Near Burbage, Wiltshire, taken at dusk, 12.viii.79. New to South Wiltshire and an extension of its distribution westwards. *Blastobasis decolorella* (Woll.), Blackford, Edinburgh. Midlothian (O.S. NT/2571), one, 31.vi.78; Musselburgh, E. Lothian, one, 9/10.vii.78; Milngavie (O.S. NS/5477), Stirlingshire, one, 12.vii.79. The species is now widely distributed in southern Scotland.

EMMET, Lt. Col. A. M. — *Etainia sericopeza* (Zeller). Two reared from cocoons on trunks of *Acer planoides* from Harlow, Essex; a local species. *Stigmella splendidissima* (H.-S.). Eight from larvae on *Rubus chamaemorus*, taken on Cairngorm, Invernessshire, and three on *R. saxatilis* at Inchmadamph, Sutherland, iv.1979. Has been confused with *S. tengstroemi* (Nolcken). Mines on *Sorbus intermedia* taken at Dhoon Glen, Isle of Man, ix.1979. They appear to belong to *Stigmella ariella* (H.-S.), a species not hitherto recorded in Britain. *S. minusculella* (H.-S.). A mine taken in north-east Essex, 10.ix.1979; this species has not been observed in

Britain for about 25 years. It has also been recorded in 1979 at New Maldon, Surrey by P. J. Johnson. *Lyonetia clerkella* (Linn.). A cherry leaf from Brightlingsea, Essex showing numerous mines; it has been exceptionally common in 1979. *Parornix alpicola* (Wocke). Twelve specimens reared from Eriboll, Sutherland, 6-5.v.1979, together with a larval mine. Known only from this locality in Britain. *Phyllonorycter roboris* (Zeller). Two reared from Budley, Notts. 23, 28.iv.1979 from larvae or pupae taken on 10.viii.1978. These dates give further evidence that the moth is univoltine in Britain. *P. viminetorum* (Staint.). Eight reared from Berechurch, Essex, 14-21.viii.1979 and two from the banks of the R. Lea near Nazeing, Essex, 21-22.viii.1979. This usually rare species is locally fairly common in Essex. *Rhigognostis annulatella* (Curt.). Five captured at Glen Maye, Isle of Man on 18.ix.1979; locally common in Mann. *Digitivalva perlepidella* (Staint.) Eight reared from Grays Chalk Pit, Essex, 9-11.vi.1979; new to the county. *Coleophora adjectella* (H.-S.). Six reared 2-18.vii.1968 from Benfleet, Essex. New to Britain being unrecognised until 1979. *C. conspicuella* Zeller. Eight reared from Benfleet, Essex, 20.vi-18.vii.1979; a very local species which is an Essex speciality. *Elachista subnigrella* Dougl. Five captured at Liston, Essex on 1.viii.1979. A rare species or, more probably, one that has been overlooked in Essex. *Agonypteryx putridella* ([D. & S.]). Seven specimens reared 18-31.vii.1979 from Hamford Water, Essex where it is abundant. *A. scopariella* (Hein.). Two reared from Asheden, Essex on 28.vii.1979. Most of the specimens in old collections seem to have been supplied by W. H. Harwood from the Colchester district but the species was lost sight of when it was wrongly synonymised with *A. pulverella* (Hübner). *Teleiodes alburnella* (Zell.). Specimens from Pods Wood, Messing; and Rowney Wood, Debden: (both Essex) taken in 1978 and 1979. It appears to be extending its range. *Mirificarma lentiginosella* (Zell.). Eight specimens reared from Hamford Water, Essex, 15-30.viii.1979. The first British specimens were taken by Douglas in Epping Forest in 1853 but it has not been observed in Essex since until 1979. *Gelechia nigra* (Haw.). Hatfield Heath, one reared 29.vi.1979; an Essex speciality. *Batrachedra pinicolella* (Zell.). Rowney Wood, Debden, Essex, eight taken 20-23.vii.1979; apparently a new colonist in Essex. *Cochylis hybridella* (Hübner). West Tilbury, five: 3.ix.1979. Unusually common along the Thames estuary in 1979. *Ptychomoloides aeriferanus* (H.-S.). Hatfield Forest, one: 9.vii.1979; apparently extending its range. *Olethreutes bifasciana* (Haw.). Rowney Wood, Debden, Essex, one: 23.vii.1979. Very local in Essex but apparently extending its range. *Apotomis lineana* ([D. & S.]). Liston, one: 1.viii.1979; a rare species. *Monochroa lucidella* (Steph.) and *Bactra furfurana* (Haw.). Specimens taken flying together on 4.vii.1979 at Matching Green: both local in Essex. *Epinotia fraternana* (Haw.). Four each from Chalkney Wood and Shardlowe's Wood, Essex, 1979, a species that is local but perhaps extending its range in Essex. *Griselda myrtillana* (H. & W.). Dunmore, Mull of Kintyre, one reared 18.v.1979. *Eucosma pupillana* (Clerck). Chigwell Row, one at M.V. light taken by I. Sims, vii.1979. This species was stated to occur "in Essex, on coasts" by Stephens in 1834. All subsequent authors repeat the record. It is quite likely that the original record referred to *E. maritima* (H. & W.) which was not separated and named until 1845 and is a coastal species. This specimen may therefore be the first authentic Essex specimen. *Pammene trauniana* ([D. & S.]). Wimbish, Essex, four: 5.vi.1979, from the only known locality in Essex. *Catoptria falsella* ([D. & S.]). Saffron Walden, one: 8.vii.1979; the first record from north-west Essex.

FAIRCLOUGH, A. J., and R. — The following bred or caught in 1979: *Enarmonia formosana* (Scop.), bred Loughton, Essex. *Epinotia fraternana* (Haw.), bred Earls Colne, Essex. *Phyllonorycter dubitella* (H.-S.), bred Bramley, Surrey. *Epinotia signatana* (Dougl.), bred Leigh, Surrey. *Phyllonorycter distentella* (Z.), bred Blean, Kent. *Agonopteryx pallorella* (Z.), bred Folkestone, Kent. *Oncocera genistella* (Dup.), bred Dungeness. *O. obductella* (Z.), Burham, Kent. *Phyllonorycter viminetorum* (Stt.), bred Woolhampton, Berks. *Coleophora limosipennella* (Dup.), bred Wyndcliff, Mon. *Gelechia muscosella* Z., Wicken, Cambs., last recorded there in 1891. *Lampronia pubicornis* (Haw.) and *Elachista dispunctella* (Dup.), Arnside, Westmorland. *Elachista kilmunella* Stt., Red Srees, Westmorland. *Glyphipterix minorella* Snell., Lindale, Lancs. *Epiblema turbidana* (Tr.), Sedgwick, Westmorland. *Stirrhopterix fusca* (Haw.), Witherslack, Westmorland. *Bucculatrix demaryella* (Dup.), Witherslack and Helsington, Westmorland. *Bryotropha umbrosella* (Z.), Sandscale. *Epinotia subsequana* (Haw.), Braishfield, Hants. *Acleris cristana* (D. & S.), f. *ruficostana* Curtis (1); f. *ruficristana* Johnson (143 of which Manley (1973) wrote he could trace only one specimen; a new form related to *ochreanigrana* Manley (2) — all bred from Essex crossed Surrey or Sussex.

FENN, J. L. — All Norfolk-caught or-bred: *Ypsolopha horridella* (Tr.), Weeting, ex larva, blackthorn, bred vii.78. *Teleiodes paripunctella* (Thun.), King's Lynn, ex larvis, *Myrica gale*, bred iii-iv.78. *Hysterosia sodaliana* (Haw.), Stoke Ferry, at m.v.l., 19.vii.76. *Acleris cristana* (D. & S.), Lynford, ex larvis, wild rose, bred vii-viii.78. *A. rufana* (D. & S.), King's Lynn, ex larvis, *Myrica*, bred '78. *Archips crataegana* (Hb.), Weeting, at m.v.l., 22.vii.78. *Ancylis uncella* (D. & S.), King's Lynn, at m.v.l., 1978. *Epinotia maculana* (F.), Weeting, ex larvis, aspen, bred 1977-78. *E. caprana* (F.), King's Lynn, ex larvis, *Myrica gale*, bred iii-iv.78. *Hysterosia sodaliana* (Doubld.), Lynford, ex larva, wild rose, bred 9.vi.78. *Eucosma pauperana* (Dup.), Hockwold, at m.v.l., 3.v.78, new county record. *Pammene auran-tiana* (Stdgr.), Oxborough, at m.v.l., 27.vii.77. *Leioptilus lienigianus* (Z.), Weeting, ex larvis, mugwort, bred vi.78.

HECKFORD, R. J. — *Adela cupriacella* (Hb.), Anstey's Cove, Devon, 2.vii.79, new county record. *Nemapogon albipunctella* (Haw.), Colehayes Park, Devon, 4.vii.79. *Telechrysis tripuncta* (Haw.), Colehayes Park, Devon, 6.vii.79. *Coleophora albitarsella* Z., Whitsand Bay, Cornwall, ex larva, *Glechoma hederacea*, bred 7.vii.79. Not recorded in Cornwall since V.C.H. *Elachista scirpi* Stt., Plympton, Devon, 4.vii.79 (6). *E. poae* Stt., Westhay, Somerset, evt pupa, bred 27.vi.79. *Depressaria pimpinellae* Z., Plympton, Devon, ex larvis, *Pimpinella major*, bred 6-30.viii.79. *Batrachedra pinicolella* (Z.), Stover Park, Devon, 30.vi.79, new county record. *Telephila schmidtii* (Heyden), Anstey's Cove, Devon, ex larva, *Origanum vulgare*, bred 24.vii.79. *Pammene populana* (F.), Plympton, Devon, ex larva, *Salix viminalis*, bred 14.vii.79. *Epinotia rubiginosana* (H.-S.), Aylesbeare, Devon, 1.vii.79; Woodbury, Devon, 22.vi.79, new county record.

HORTON, Dr. G. A. Neil. — (A). MONMOUTHSHIRE, 1979: *Ephestia parasitella* Stdgr., Usk, 2.vii. *Dioryctria abietella* (D. & S.) (2); has become widespread in county during last 2-3 years. *Parapoynx stagnata* (Don.), Usk, 25.vii; rare in Monmouthshire. *Archips crataegana* (Hb.), Monmouth area, vii. *Epiblema scutulana* (D. & S.), 16.vi. *E. scutulana* f. *circiana* (Z.), v. *Pammene argyrana* (Hb.), 4.vi. *Ptycholomoides aeriferanus* (H.-S.), Monmouth area, 16.vii. *Lozotaeniodes formosanus* (Geyer), S. Monmouth-

shire, 23.vii; new v.c. record. *Cydia strobilella* (L.), Wye Valley, 25.v; new v.c. record. *C. conicolana* (Heyl.), Monmouth area, 29.v; new vic. record. *Leucoptera spartiifoliella* (Hb.), Monmouth, 8.vii. *L. wailesella* (Stt.), Usk, 1.ix; new v.c. record. *Morophaga chragella* (D. & S.) (= *boleti* (F.)), Monmouth area, 9.vi; believed new v.c. record. *Triaxomera parasitella* (Hb.), Monmouth area, 9.vi. (B). BRECONSHIRE, 1979: *Pyrausta cingulata* (L.), 10.vii; new to Breconshire. LINCOLNSHIRE, 1979: *Cochylis atricapitana* (Steph.), 5.viii.

LANGMAID, Dr. J. R. — *Teleiodes wagae* Nowicki, Botley Wood, Hants., four bred from *Corylus avellana* and the first bred from England. *Chamberisia augustella* (Hb.), Southsea, Hants., 18.vi.79, one taken at m.v. A selection of Oecophoridae and Coleophoridae bred during 1979, including *Agonopterix liturella* (D. & S.) and *A. bipunctosa* (Curtis) with a table summarising the differences between the two species.

MICHAELIS, H. N. — Carneddau (1,500-1,700 ft.), Snowdonia National Park: *Acleris hastiana* (L.), *Ancylis myrtillana* (Tr.), *Elachista kilmunella* Stt., *Acleris rufana* (D. & S.), *Elachista eleochariella* Stt.

PELHAM-CLINTON, E. C. — *Nemapogon heydeni* Petersen, Bovey Tracey, Devon, ♀ 7.vii.1979, taken on the wing in early morning sunshine. A widespread species in continental Europe. This is the first known British specimen.

SOKOLOFF, P. A. — A selection bred or captured during 1979: — *Cnaemidophorus rhododactyla* (D. & S.), ex *Rosa*, Herts. *Mompha miscella* (D. & S.), *Scythris fletcherella* Mey., *Teleiodes sequax* (Haw.) and *Syncompama taeniolella* (Z.), all bred from a small patch of *Helianthemum* on railway embankment, Badgers Mount, Kent, the latter believed to be on an unrecorded foodplant. *Monochroa lucidella* (Steph.), Stoke Saltings, Kent, 16.vii. *Apodia bifractella* (Dup.) and *Ptocheuusa paupella* (Z.), both bred from seedheads of *Pullicaria dysenterica*, Orpington, Kent. *Phyllonorycter emberizaepenella* (Bouche), bred ex *Lecesteria formosa*, Bromley, Kent. *Ethmia funerella* (F.), Wood Walton Fen, Hunts., 24.vii. *Udea uliginosalis* (Steph.), slopes of Ben Nevis, Inverness-shire, c. 2,800 ft., 6.viii. *Catoptria falsella* (D. & S.), Wicken Fen, 24.vii.

STERLING, Col. D. H. — Bred from a small clump of roots each of *Artemisia*, *Tanacetum* and *Achillea* dug from waste ground at Southsea, 27.xii.78. The roots were left out in the open during the winter. In the spring, they were placed in a carton covered with netting and kept in a shaded area in an unheated greenhouse. The following emerged during the summer of 1979: *Isophrictis striatella* (D. & S.) and *Dichrorampha sequana* (Hb.), from *Tanacetum*. *D. petiverella* (L.), from *Achillea*. *D. plumbagana* (Tr.), *D. sequana* (Hb.), *D. plumbana* (Scop.), *Epiblema foenella* (L.), *Dolicharthra punctalis* (D. & S.) and *Endotricha flammealis* (D. & S.) from *Artemisia*.

WHITEBREAD, S. E. — (A). A representative selection of specimens taken by the exhibitor, mostly at light, during a three week holiday to Natal, Transvaal, Cape Province and Swaziland in March 1979. (B). *Cosmiotes consortella* Stt., Dartford Marsh, Kent, at m.v.l., 7.viii.78. (C). A selection of species taken or bred from Switzerland, Italy and France during 1977-79, but mainly from the former country. Of special interest were: 14 species of Psychidae including the first specimens of *Solenobia leoi* Dierl from Switzerland and *S. rupicolella* Sauter from the Valais.

WILDE, E. H. — *Pandemis cerasana* (Hb.), a halved gynandromorph. New Forest, 1.viii.79. *Aethes hartmanniana* (Clerck) and *Cochylis flavicilliana* (Westwood), Addington, Surrey, vii.77. *Teleiodes wagae* (Now.), Botley Wood, 2.vi.79. *Argolamprotes micella* (D. & S.), S. Devon, 30.vii.78.

FOREIGN MACRO-LEPIDOPTERA

Exhibits of foreign lepidoptera were fewer than in many past years, but contained much of interest. The largest, by C. B. ASHBY and STIG. TORSÉNIUS, comprised ten drawers of Scandinavian Noctuidae from the collection which the latter has presented to the Society. They were accompanied by a display of photographs and maps of typical habitats and flora in the Baltic littoral and islands, the Swedish part of the great European pine forest which extends eastwards to the Urals, and the unique Scandinavian Alvar heath.

Of other European countries Spain was well represented. R. W. DYSON and P. W. CRIBB showed large selections from 127 species of butterflies recorded during an expedition from 26th July to 9th August 1979 across north and central Spain from the Picos de Ebro to the Montes Iniversales near Albarracín. The most remarkable were, of *Lysandra caelestissima* Verity, a perfectly halved gynandromorph and examples of the rare blue female form, which resembles *L. coridon* Poda f. *syngrapha* Kef., also two Skippers, set as undersides, which defied identification but which may turn out to be extreme aberrations of *Spialia sertorius* Hfmsg.; and some *Pyrgus cynarae* Rambur, which is little known in Spain, from a new locality. Other interesting species shown were *Meleageria daphnis* (D. & S.) with wholly brown females, and very large *Minois dryas* (Scop.), which is known only very locally in Spain near the north coast. Eight species indigenous to Spain were also shown, including *Erebia palarica* Chapman, of which eggs were obtained, and *Agrodiaetus ainsae* (Forster) and *A. fabressei* (Obth.). R. W. DYSON also showed some butterflies from Algarve in Portugal in April. M. LEECH had bred specimens of moths from the Costa del Sol, and G. M. TREMEWAN showed twelve species of Zygaenidae in their local subspecies from the provinces of Alicante, Teruel and Cuenca.

From France G. N. BURTON exhibited butterflies caught in the Central Pyrenees in August, where despite poor weather *Apatura iris* (L.) was numerous. S. E. WHITEHEAD had a large exhibit which included some 30 species of macrolepidoptera from Switzerland, among which it was good to see the British rarities *Tritophia tritophus* (D. & S.), *Hybocampa milhauseri* (F.), *Gluphisia crenata* (Esp.), as well as *Hoplodrina superstes* (Ochs.) and *Caradrina flavirena* (Guen). From another part of the world he also showed 70 species of macro- and microlepidoptera taken at light in South Africa. Dr. C. J. LUCKENS had a selection of butterflies caught in the Swiss Engadine and Northern Italy in early July 1979. E. P. WILTSHIRE, with help from the British Museum (Nat. Hist.) illustrated the distribution and geographic variation of the known races of *Photedes morrisii* (Dale) (Bond's Wainscot) in the Palaearctic zone.

S. R. BOWDEN illustrated finding relating to Californian *Artogeia (napi) microstriata* Comstock. Breeding experiments in 1979 appeared to show that it possesses a "pale yellow" gene, previously found in the Oregon spp. *marginalis* Scudder. Female hybrids with European *napi* are sterile, making the conspecificity of spp. *microstriata* and ssp. *napi* very doubtful. This was the only exhibit from the New World; but D. A. TREMBATH showed butterflies and moths collected in January 1978 and 1979 in Natal and the Transvaal in

South Africa, and T. G. HOMER a striking collection of Australian lepidoptera in Queensland, Australia from December to March 1978/79. From the Tropics, T. W. HARMAN had a fine lot of Hawk Moths and butterflies taken mostly on Ulu Temburong Expedition in Brunei in October 1978 and in other places there in 1978 and 1979. The Hawk Moths, of which 23 species were shown, were all caught at mercury vapour light.

COLEOPTERA

As usual the number of exhibits was small, however they made up for in quality what they lacked in quantity. As well as the exhibits listed below, Coleoptera featured in a fascinating exhibit on the folklore of insects by G. F. Le Pard.

HODGE, P. J. — A selection of forty-six species of Coleoptera taken in S.E. England during 1978-79. Included were three rare staphylinids, *Micropeplus tesseraula* Curt. from Arundel Park, *Oxytelus fulvipes* Er. from Horam and *Dacryla fallax* (Kr.) from near Eastbourne. Another rarity shown was *Hylis olexai* (Palm.); a comparatively recent addition to the British fauna, which breeds in dead beech trees. The specimen was swept from a wood near Ashington which is the fourth British locality for this species. Four other species also associated with timber were exhibited, these were *Scaptia testacea* Allen from Buxted Park, *Ischnomera sanguinicollis* (F.) from Arundel Park, the rare Scolytid *Dryocoetinus alni* (Georg.) from Ashdown Forest and *Epuraea angustula* Sturm. from near Ashington. The latter species is a Nitulid which is very rare in southern Britain and is found near the burrows of Scolytids. Another rarity taken in 1978-79 was *Corticaria umbilicata* (Beck.) from Eridge. The exhibitor also showed a specimen of the very rare Curculionid *Ceuthorhynchus pectoralis* Weise, taken at Plaistow in 1972 but only recently identified. All the above localities are in Sussex and the exhibitor can find no previous records of these ten species from Sussex.

HORTON, Dr. G. A. NEIL. — A selection of forty-three species of Coleoptera collected in Monmouthshire between 1977 and 1979. Part of the exhibit was devoted to a number of species taken from the same Monmouthshire wood during summer 1979. Of particular interest is the occurrence there of all three British species of the Pyrochroidae. A single specimen of *Pyrochroa pectinicornis* (L.) was found there on 26.vi.1979 and this probably is a new county record. The species is said to occur very locally in Scotland but has once been recorded from the neighbouring county of Herefordshire. *Trichius fasciatus* (L.) was also taken in the wood. The remainder of the exhibit consisted of Coleoptera from various parts of Monmouthshire and included two new vice-county records, *Criocephalus rusticus* (L.) taken at Usk on 27.vii.1979, a rare Longicorn associated with pines and of chiefly Scottish distribution, and *Aulonium trisulcum* (Geof.) taken at Usk on 11.viii.1977 and 21.x.1977, this is a very rare Clavicorn. Other species shown which are not often met with were *Gonodera ceramboides* (L.), *Platycis minuta* (F.), *Pediacus dermestoides* (F.), *Rhizophagus nitidulus* (F.), *Cerylon fagi* Bris. and *Carpophilus sexpustulatus* (F.).

PARRY, J. A. — An exhibit of living adults and larvae of *Chrysolina cerealis* (L.) feeding on thyme. The specimens were bred from wild Snowdon stock. This was a topical exhibit as the species is included in the schedule of vulnerable animals for the proposed Wildlife and Countryside Bill. The exhibitor was of the opinion, however, that the beetles retiring habits meant that it was in no danger from collectors. Also exhibited were four species of the difficult genus *Cercyon*, these were *C. granarius* (Er.), *C. minutus*

(Muls.), *C. sternalis* (Sh.) and *C. convexiusculus* (Steph.).

SHAW, Dr. M. R. — Adult and larval mine of *Trachys minuta* (L.), an uncommon leaf-mining Buprestid beetle. The mined leaf of *Salix atrocinerea* was collected at Hell Coppice, Bucks., on 12.iv.1979 and the adult emerged on 6.x.1979. A superficially similar leaf-mine made by the larva of the sawfly *Heterarthrus microcephalus* (Klug), which is often abundant on *S. atrocinerea* and related species, was shown for comparison. A conspicuous shiny black dried secretion covering the egg of *T. minuta* at the leaf apex distinguishes the mine of this species from that of the sawfly.

DIPTERA

CHANDLER, P. J. — (1) Some notable Diptera found in Windsor Forest and Great Park, Berks., in recent years: *Myolepta luteola* (Gmelin) (Syrphidae), ♀, 17.vi.1978, sunning on bracken, not seen in area for many years; *Pocota personata* (Harris) (Syrphidae), ♂, 4.vi.1978, flying to beech with high level rot hole, the normal breeding site; *Megasyrphus annulipes* (Zetterstedt) (Syrphidae), ♀, 8.iv.1979, first record, scarce in south-east, commoner in Scotland; *Calliprobola speciosa* (Rossi) (Syrphidae), ♂, 17.vi.1979, flying to cut logs, another seen on same day settling in cavity at root of fallen tree; *Criorhina ranunculi* (Panzer) (Syrphidae), ♂, 3.vi.1979, both red and white tailed forms visiting hawthorn flowers towards dusk; *C. asilica* (Fallén) (Syrphidae), ♂, 17.vi.1979, generally scarce but frequent in Windsor area; *Volucella inflata* (Fabricius) (Syrphidae), ♂, 17.vi.1979 on *Rhododendron* in Great Park; *Rainieria calceata* (Fallén) (Micropezidae), ♀, 17.vi.1979, several on fallen oak branches at south end of Park in 1979 — this species known only from Windsor area in Britain is normally on beech; *Leptomorphus walkeri* Curtis (Mycetophilidae), reared in 1979 from pupae suspended, each by a single thread, from the underside of damp fungus encrusted logs; (2) series of the three British species of *Allophora* (Tachinidae), all parasites of plant bugs, to show the range of variation in male size, abdominal and wing colouration in the two larger species. *A. hemiptera* (Fabricius) has been considered a mimic of its pentatomid hosts as its males frequently have the wings strongly marked on the anterior half. It is probably most frequent in the north and west of the British Isles but is rather scarce in the south-east, where it is perhaps now best established in Sussex, where it occurred at Rogate Common and King's Park Wood in 1979. About thirty were observed at *Oenanthe* flowers in Castramon Wood, Galloway in July 1979. The infra-specific variation was strongly noticeable in this population. Larger males have more yellow on the wings and the brown markings are restricted to two anterior spots, one at the wing tip and a longitudinal bar over the costal cells, or sometimes a median brown bar parallel to the latter is developed on the posterior border of the yellow anterior half of the wing. In smaller males the brown is always more extensive and the three brown spots are fused. The amount of yellow on the abdomen varies independently, as both large and small males may have broad or narrow yellow side margins. The females have clear wings. The two smaller species are more common in the south, especially on chalk downland where they may be swept from long grass while *hemiptera* is more typical of marshy woods and stream-sides where it visits white flowers especially of umbels. *A. obesa* (Fabricius) shows a range of variation in the male wings similar to that of *hemiptera*, i.e. more suffused with brown in smaller individuals but the brown becomes more restricted to the veins in larger examples, leaving clear areas between. The wings are clear in females and in both sexes of the smallest species *A. pusilla* (Meigen)

McLEAN, I. F. G. — Some scarce species collected during 1979: *Pocota personata* (Harris) (Syrphidae), ♂, Windsor Forest, Berks., 2.vi at hawthorn flowers; *Didea fasciata* Macquart (Syrphidae), ♀, data as *P. personata*; *Criorhina asilica* (Fallén) (Syrphidae), ♂, data as *P. personata*, ♀ settled on leaf; *Psilota anthracina* Meigen (Syrphidae), ♂, Chobham Common, Surrey, 3.vi, hovering near hawthorn blossom; *Megasyrphus annulipes* (Zetterstedt) (Syrphidae), ♂, King's Park Wood, Sussex, 15.vi; *Criorhina ranunculi* Panzer (Syrphidae), ♀, wood near Cranleigh, Surrey, 4.vi, at hawthorn flowers; *Servillia lurida* (F.) (Tachinidae), data as *C. ranunculi*; *Conops vesicularis* L. (Conopidae), ♂, King's Park Wood, Sussex, 15.vi, at *Viburnum opulus* flowers; *Odontomyia ornata* Meigen (Stratiomyidae), ♂, West Sedge Moor, Somerset, 19.vi, at *Heracleum* flowers; *Acanthocnema glaucescens* (Loew) (Scathophagidae), ♂, Hannaston Wood, Galloway, 16.vi, swept beside shaded stream.

PACKER, L. — Scarce Syrphidae from Devon, vii.1979: *Callicera aenea* (F.), Chudleigh Knighton; *Xylota florum* (F.), Stover Lake.

SOKOLOFF, P. — *Tabanus sudeticus* Zeller (Tabanidae), Fort William, Inverness, 3.viii.1979.

STUBBS, A. E. — A range of uncommon or notable Diptera collected during 1979, including the pipunculid *Nephrocercus scutellatus* Macquart, new to Britain, King's Park Wood, Sussex, 15.vi. Most of the others were taken during surveys based in Sussex, Devon, Galloway and Gloucestershire. *Cheilosia vulpina* (Meigen) (Syrphidae), Rogate, Sussex, 8.vi; *Tetanocera punctifrons* Rondani (Sciomyzidae), by River Rother, Sussex, 8.vi; *Atherix ibis* (F.) (Rhagionidae), data as last; *Pocota personata* (Harris) (Syrphidae), Colehays Park, Devon, 30.vi; *Xylota florum* (F.) (Syrphidae), Stover Lake; *Alophora hemiptera* (F.) (Tachinidae), 2 ♂, 1 ♀, Emblett Hill, Devon, 2.vii; *Xylophagus ater* Meigen (Xylophagidae), Colehays Park, Devon, vii; *Parhelophilus consimilis* (Malm), Carrick Pools, Galloway, 18.vii, new to Scotland; *Haematopota bigoti* Gobert (Tabanidae), Caerlaverock N.N.R., 15.vii, new to Scotland; *Pyrophaena granditarsa* (Forster) (Syrphidae), 2 ♀, Castle Loch, Galloway, 14.vii, melanic females similar to two collected in north Wales; *Atherix marginata* (F.) (Rhagionidae) Corsock, Galloway, 16.vii; *Hydrodromia wesmaelii* (Macquart) (Empididae), Woodchester Park, Glos., 11.x; *Paradelphomyia fuscula* (Loew) (Tipulidae), Prescott Hill, Glos., 12.x; *Didea fasciata* Macquart (Syrphidae), Stroat, Glos., 13.x. Also a few species from other areas: *Chrysotoxum elegans* Loew (Syrphidae), Box Hill, Surrey, 26.ix; *Cheilosia nigripes* (Meigen) (Syrphidae), Box Hill, Surrey, 12 and 13.vi; *Odontomyia ornata* Meigen (Stratiomyidae), North Moor, Somerset, 18.vi; *Hybomitra muehlfeldi* (Brauer) (Tabanidae), Crymlyn Bog, Swansea, Glamorgan, 28.vii.

HYMENOPTERA

(Aculeata)

ELSE, G. R. — Aculeate Hymenoptera collected in Hampshire and the Isle of Wight, 1979. Uncommon species included *Heydychridium roseum* (Rossius) (Chrysididae), one, New Forest, heathland adjacent to Denny Wood, 8.viii; *Chrysis helleni* Linsenmaier, one ♀, Botley Wood, near Wickham, Hants., 5.viii (D. M. Appleton). *Aporus unicolor* Spinola (Pompilidae), one ♂, one ♀, Oxenbourne Down, near Petersfield, Hants., 5.viii, one ♂, St. Catherine's Hill, near Winchester, Hants., 10.viii. *Ectemnius dives* (Lepeltier & Brullé) (Sphecidae), one ♀, Botley Wood, 21.viii — new to Hants. (D. M. Appleton); *Gorytes bicinctus* (Rossius),

one ♀, Botley Wood, 28.vii (D. M. Appleton); *Philanthus triangulum* (F.), one ♂, one ♀, Isle of Wight, southern coastline, viii (this very rare species is virtually confined to the Island where it is known from two localities). *Colletes halophilus* Verhoeff (Colletidae), one ♀, Botley Wood, 21.viii — a salt marsh species new to Hants. and well to the west of its known range in Britain (Kent to Lincolnshire). One ♂, Tichfield Hayden, near Hill Head, Hants., 11.ix (both collected by D. Appleton). *Andrena cineraria* (L.) (Andrenidae), one ♂, West Wood, near Winchester, 19.v — apparently new to Hants.; *A. proxima* (Kirby), one ♂, one ♀, Ventnor-Steephill Cove area, 26.v and its rare cleptoparasite, the bee *Nomada conjugens* Herrich-Schäffer (Anthophoridae), same locality, one ♂, 26.v and one ♀, 9.vi. *Sphecodes reticulatus* Thomson (Halictidae), two ♂♂, Red Cliff, near Sandown, Isle of Wight, 18.viii. *Osmia pilicornis* Smith (Megachilidae), one ♂, one ♀, West Wood, near Winchester, 19.v and one ♀, Firestone Copse, near Havenstreet, Isle of Wight, 20.vi (a very scarce species in recent years but recorded from several localities in southern England in 1979); *O. xanthomelana* (Kirby), one ♀, Isle of Wight, southern coastline, vi (the most recent records for this species are two localities on the Island, but formerly the bee was more widely distributed, occurring as far north as Lancashire).

HARMAN, T. — A selection of Hymenoptera taken on the Ulu Temburong Expedition, Brunei, 1978. Twenty-six aculeate species, mostly large, exotic and colourful insects. These included a ♀ *Xylocopa myops* Ritsema (Xylocopidae) and a pair of *X. latipes* (Drury) — both 'Carpenter bees', *latipes* being one of the largest of the world's bees. Among the wasps were a ♀ *Megascolia procer* (Illiger) (Scoliidae), ♀ *Hemipepsis stigmata* Wahis (Pompilidae) and a worker *Vespa tropica* L. (Vespidae).

PACKER, L. — Aculeate Hymenoptera collected in Kent, the Isle of Wight and Devon, 1979. These included *Evaetes pectinipes* (L.) (Pompilidae), one ♂, Sandwich Bay, Kent, 5.viii (its only known British site). *Miscophus ater* Lepeletier (Sphecidae), one ♂, one ♀, Sandwich, 5.viii (almost confined to this locality); *Crossocerus distinguendus* (Morawitz), one ♂, Canterbury, Kent, 23.vi, two ♂♂, three ♀♀, Faversham, Kent, 28.vi-25.vii; *Oxybelus argentatus* Curtis, one ♂, one ♀, Braunton Burrows, Devon, 3.vii; *Philanthus triangulum* (F.), one ♂, one ♀, Isle of Wight, southern coastline, viii. *Andrena apicata* Smith (Andrenidae), one ♀, Upper Haldes, near Canterbury, 14.iv; *A. bucephala* Stevens, one ♂ Folkestone Warren, Kent, 12.v.; *A. labiata* F., one ♀, Manaton, Devon, 5.vii (A. E. Stubbs). *Osmia pilicornis* Smith (Megachilidae), one ♂, Upper Haldes, 14.iv, one ♀, Harbledon, near Canterbury, 16.vi; *Coelioxys mandibularis* Nylander, one ♀, Sandwich Bay, 5.viii (small race, probably cleptoparasite of *Megachile leachella* Curtis). *Nomada sexfasciata* Panzer (Anthophoridae), one ♀, south Devon, vii.

A distribution map of *Crossocerus distinguendus* (Morawitz) in Britain was also exhibited. Its present known distribution is East Kent (Pegwell Bay, Westbere, Sturry, Canterbury, Graveney, Faversham. L. Packer, J. C. Felton and T. Harman) and Surrey (Ewell, D. B. Baker). This species is apparently locally abundant in some of the Kentish localities. A paper admitting this wasp to the British list is currently being prepared by Mr. Packer.

PORTER, J. — A collection of seven bumblebee species from Surrey, Sussex, Hants. and Gwynedd. These included a ♀ *Bombus monticola* Smith (= *lapponicus* misident.) (Apidae), Cader Idris, Gwynedd, 3.vi.79.

WILLIAMS, P., and DIVERS, A. — Bumblebees from Dungeness, Kent (mostly the shingle foreland) and adjacent marshes. The exhibit illustrated a preliminary investigation of regional diversity in *Bombus*, with particular reference to Dungeness. Thirteen species from this area were provided as examples and included *Bombus subterraneus* (L.), *runderatus* (F.) (included the melanic form), *muscorum* (L.), *sylvorum* (L.) and *Psithyrus rupestris* (F.). All collected during 1979.

(*Parasitica*)

The exhibits of the two contributors to this section reflected the slowly increasing state of knowledge of this unwieldy assemblage, both in distribution by adults and in host-parasite relationships.

ALLEN, Dr. A. A. — A box of Braconidae *Apanteles* spp., all bred from lepidopterous larvae in 1979. The species included *A. xanthosigma* (Haliday) ex *Caloptilia elongella* (L.) bred 10.vi.79; *A. circumscriptus* (Nees) ex *Phyllonorycter messaniella* (Z.) many bred from mines in *Quercus ilex*, collected 21.iv.79; *A. vitripennis* (Curtis) ex young larvae of *Lithophane leautieri* (Boisd.); *A. acasta* Nixon from a pre-pupa of *Amphipyra pyramidea* (L.); this host seems to be the main prey of *A. acasta*, since the latter's description by Dr. Nixon; these four spp. were all obtained on Brownsea I., Dorset. From Littlehampton, Sussex, three spp. of *Apanteles* were obtained all from larvae of *Abraxas grossulariata* (L.) all collected from blackthorn near the sea in April. The species bred were *A. limbatus* Marshall (common), *A. formosus* (Wesmael), and the much rarer *A. endemus* Nixon (one ♀). *A. tibialis* (Curtis) was bred from *Anarta mytili* (L.) (host, Little Haldon, Devon, August 1979); *A. popularis* (Haliday) from larvae of *Tyria jacobaeae* (L.) (larvae September 1978 at Littlehampton; the adult *popularis* did not emerge until July 1979 and *A. immunis* (Haliday) bred from *Apocheima pilosaria* (D. & S.), also from Brownsea I., Dorset. A second lot of adult Ichneumonidae, caught in 1979, included *Apanteles falcatus* (Nees) from Tywardreath, Cornwall, Aug.; *A. phaloniae* Wilk. (Dawlish Warren, Devon, Aug.); *A. leucaniae* Wilk. (Brownsea I., Dorset, Aug.); *Zele flagitator* (Curtis) (Hurst Green, Sussex, Aug.); *Meteorus consimilis* (Little Haldon, Devon, Aug.); *M. pallipes* (Wesm.); and *Hypomecus quadriannulatus* (Grav.), (both Shaldon, Devon, Aug.), and finally a series of Ichneumoninae all found in rotten wood on Haldon Moors, Devon, mostly in large numbers. Although very many Ichneumoninae hibernate as adults, it was interesting that the species found were mostly invariable, perhaps reflecting the different hibernation-modes of other species. The species found were:— *Hoplismenus bidentatus* (Gmelin), only found in April, rare; *Ichneumon bucculentus* (Wesm.) (common, cf. Perkins 1960 who states it is uncommon); *I. suspiciosus* Wesm. (very common); *I. extensorius* L. (common); *I. sarcitorius* L. (moderately common) and *Stenichneumon culpator* (Shrank) (abundant; there were upwards of fifty in some tree-stumps, the last five species found both in April and October). The stumps (pine) had arisen from moorland fires in spring 1976; heather was now growing and evidently the rotten stumps provided ideal conditions for certain overwintering females of the Ichneumoninae.

SHAW, Dr. M. R.—First box consisted of a selection of the tribe *Exothecini* (Braconidae) which are primitive ectoparasites. Notes on their host ranges were supplied. A few examples of the endoparasitic tribe *Rogadini* were also included, notably the species *Aleiodes pallidator* (Thunb.) only recently recorded from Britain — it was first thought only to occur on

the Lancashire coast, but more recently it has been discovered in Hants., (Portsmouth) and Kent (Dungeness). It parasitises *Leucoma salicis* (L.) (Lep., Lymantriidae) and the exhibitor appealed for records of the parasites from this moth. Affected larvae may be recognised by their blown, mummified appearance. Among the *Exothecini* were: — *Colastes incertus* (Wesm.) from cocoons found in leaf litter, supplied by K. P. Bland; *C. braconius* (Haliday), a common sp., ex *Phyllonorycter* sp. (Lep.), *Orchestes* (Col.) and *Agromyzidae* (Dipt.); *Panomeris* (?) *catenator* (Haliday) a local sp. ex certain leaf-mining saw-fly larvae, especially *Fenusa pusilla* (Lepell.); *F. dornii* (Tischbein), *Xenarcha lustrator* (Haliday), a local sp. ex *Fenella nigrita* Westw. (Hym., Symphyta); *Rhysipolis deorator* (Haliday), a local sp. ex an arboreal *Caloptilia* sp. and *R. hariolator* (Haliday) a local parasite of arboreal *Parornix* sp. The Rogodini included *Clinocentrus gracilipes* (Thomson), an abundant parasite of *Anthophila fabriciana* (L.) (Lep., Choreutidae). Further records of reared *Clinocentrus* spp. (identifiable as parasites mummifying the Micro-lepidopterous host prepupa in its cocoon), were urgently requested (to be sent to the exhibitor, c/o Dept. of Zoology, Reading University, Berks).

A second lot by the same exhibitor showed a selection of recent rearings of *Apanteles* spp., (Braconidae) and included *A. halidayi* Marshall ex *Glyphipterix simplicicella* (Sephens); *A. abila* (Nixon) ex *Coleophora trochicella* (Dup.) bred by Dr. J. R. Langmaid; these two are both first host-records for the parasites; a second record for 1979 of the latter species was bred from *Abraxas grossulariata* (L.) from Bucks.; *A. aptus* Papp. ex *Coleophora badiipennella* (Dup.), bred in Switzerland by S. E. Whitebread, a first host record; *A. pedius* Nixon, a new to Britain, and bred from *Phyllonorycter* sp. on *Corylus*, *Carpinus* and *Alnus* from Oxfordshire, Essex and Berks.; and finally *A. fausta* Nixon which the exhibitor had shewn to be distinct from the closely related bisexual sp. *A. lateralis* (Haliday). *A. fausta* reproduces by thelytokous parthenogenesis. Both attack the same host, *A. fabriciana*, as solitary parasites. Finally, an example of gregarious endoparasitism: from a cluster of five cocoons found on *Corylus avellana* in a Hampshire oak-wood the exhibited ♀♀ of *Lissonota mutator* Aubert (det. J. P. Brock) had appeared; not previously recorded from Britain.

Both exhibitors expressed their thanks to breeders of various insect orders who thoughtfully preserve encountered parasites and donate the specimens with the valuable host records. Such records contribute significantly to the advancement of the knowledge of the Parasitica. (*Symphyta*)

HALSTEAD, A. J. — Some British sawflies, collected mainly in Surrey. Thirty-five common and widely distributed species (representatives of four families), including a number reared from larvae.

NEUROPTERA

ODONATA

WILD, E. H. — Two specimens of *Drepanepteryx phalaenoides* (L.) taken at his m.v. trap at Selsdon on 28.xi.1979. (This is a considerable rarity in S.E. England.)

DAVIES, A., & GODDARD, D. — Two drawers of dragonflies illustrating the range of size and shape to be found in the world and the British fauna. *Eriophlebia superstes* — from Japan was one of the oldest (phylogenetically); *Mecestogaster lucretia* — from South America was the longest; *Megaloprepus cerulatus* — from Costa Rica had the widest wingspan; and *Agriconemis femina* — from Malaya was one of the smallest.

GENERAL

PARD, LE G. F. — The Folklore of Insects, an exhibit with considerable text on this subject supported by a few illustrations and insects.

LIBRARIAN, THE — A selection of the wide range of British and foreign journals housed in the Society's library. These are available for reference at ordinary meetings and may be taken out on loan by members.

PHOTOS AND PAINTINGS

BRADFORD, E. S. — A selection of paintings of British Gelechiidae.

CRONN, A. R. — Five albums of colour prints; four of British Lepidoptera and one of British Odonata.

MERRIFIELD, K. — Eight colour photos; flies, moths, ants, a dragonfly and sawfly catkins.

REVELS, R. C. — Seven large panels of colour photos of British Butterflies. These illustrated a selection of Chiltern butterflies, bred varieties of the Silver-washed Fritillary, varieties of the Ringlet and the White Admiral, the five British Hairstreaks and the life cycle of eight species. Perhaps the most remarkable subject was a photo showing a congregation of 70 specimens of the Silver-Studded Blue, *Plebejus argus caernensis* Thompson.

SOUZ DE, P. M. — A selection of colour photos of British Lepidoptera and a dragonfly, taken with natural light.

VICKERS, W. A. — 111 colour photo enlargements from his Ectachrome transparency collection. All British indigenous species and regular migrants were shown, arranged by season, and six photos represented examples of butterfly habitats.

PRESIDENTIAL ADDRESS

(read on the 8th February 1979, by G. PRIOR)

I. TOPICAL REMARKS

When I first joined this Society many years ago I little thought that I would one day follow in the footsteps of such great entomologists as Barrett, Tutt, South, Cockayne and many others and take my turn as President. I am proud to have sat in the place that they once occupied and thank my fellow members for the honour that they have done me.

I think that we can claim that the past year has been a successful one for the Society. Our numbers have increased, not spectacularly it is true, we now stand at 731, but we should remember that for a voluntary society such as ours a very large increase in the membership can pose as many problems as a decrease. Without doubt the most significant event of the year was the publication of the "Illustrated Papers on The British Micro-Lepidoptera", as the stock of coloured plates was limited, the numbers of the volumes produced has been only 470. The venture has been an unqualified success and there is no doubt that this has been due mainly to the energy and drive of my successor David Agassiz. Our other publication, is the revised "Field Guide to the Smaller British Lepidoptera", the Society's thanks for this work are due to Col. Emmet and his fine team of experts, but I think that the main credit for this must go to my predecessor, Ralf Tubbs; its materialisation is due to his vision and energy in pushing this project ahead. Having told you what my predecessor and successor have done, you may well ask, what did I do? Alas, little more than use what administrative skill I have to pilot the Society through another year.

The Annual Dinner was a success but numbers attending fell to 66; I am certain that the reason must be the great expense incurred by our Country Members who have to stay overnight in London for the Exhibition next day. May I appeal to all of those of us, who are fortunate or unfortunate, depending on how one views it, to live in London, to offer hospitality to their country colleagues. The Exhibition on the other hand was an unqualified success both in numbers attending, number and quality of the exhibits and the smooth organisation. The excellence of the refreshments shows that the hour will produce the right woman as well as the right man, and I am very glad that Mrs. F. Murphy has agreed again to organise the refreshments at this year's Exhibition. When I saw all the fine things on show at our exhibition I confess that I wondered a little at all the complaints about the bad year that it had been. I thank all my fellow Officers and Council for the support they have given me during my year.

I had hoped that my term as President would be distinguished by having no members die during it; alas it was not to be so, we lost eight of our oldest and best.

Mr. L. W. Siggs joined the Society in 1948; a keen and very knowledgeable entomologist, he retired to the New Forest from Orpington some twenty years ago. He wrote regularly in the Entomological journals about Lepidoptera, particularly those of the New Forest area.

Mr. C. Wainwright was a lepidopterist and one of our oldest members; in fact, but for his death, he would have been elected a Special Life Member, having completed this year fifty years as a member; he lived in the Warwick area and for that reason was not a regular attender at either meetings or exhibition.

Mr. G. S. Woollatt joined the Society in 1967 whilst living in Surrey. He moved some time later to the New Forest area. He was a keen Lepidopterist and a regular attender at field meetings.

Mr. R. C. R. Crewdson joined the Society in 1933, but he will be best known as one of the great field entomologists of the North-West of England. He might be described as having been the anchor-man of the Lancashire and Cheshire Entomological Society of which he was President for twenty-one years. He was also a Council member of the Manchester Entomological Society. A fine and competent entomologist, he was well known as an authority on the Scottish Lepidoptera, particularly the Noctuids. He also did considerable work on the distribution of the British Lepidoptera, producing species maps before the Biological Records Centre was set up.

Jonathan Walton joined us in 1971 at the age of seventeen; he was a keen entomologist since the age of eight; some time after leaving school he joined the International Voluntary Service and took a teaching post in Botswana; on returning from this he continued to study hard with the intention of taking a B.Sc. course, and had been accepted for Bristol University, when he was struck down by his fatal illness. His mother tells me that the great interest in his life was always entomology, particularly the Micro-lepidoptera, and that he was proud, of his membership of our Society. What a tragedy that he should be struck down at twenty-five.

Sir Henry Lawson was also a member of the Society for 50 years. He was educated at Lancing and went straight from there to a commission in the Army and service in France. He survived the battle of Passchendaele and was awarded the M.C. After the war he returned to Trinity college, Cambridge, and then became a solicitor. He became chief Legal Auditor

and Deputy General Manager of Lloyds Bank. He was President of the Law Society. He had a life long interest in entomology, mainly the Lepidoptera, and was also a keen ornithologist.

Brigadier H. L. Lewis will of course always be remembered for that fine book "Butterflies of the World". He was commissioned into the Royal Signals in 1927 and then served in India and Burma, where he helped in quelling a rebellion. Then, after a term in Egypt, to Staff College, and thereafter to various appointments. During the last war he commanded the Signals of Montgomery's Army Group after the invasion of Europe. After the war he returned to India and became Director of Signals, Pakistan, finally serving in Malaya from 1957-60 when he retired. He was made C.B.E. in 1963. He came to live in Richmond, and took a keen interest in local affairs, becoming Deputy Mayor of that borough. Like many other entomologists he was a keen philatelist and was an acknowledged authority on Persian stamps. He joined the Society in 1961.

C. R. Haxby joined our Society in 1958; he was a keen entomologist interested mainly in the Lepidoptera. He lived in Bradford but none the less was a regular attender and exhibitor at our Annual Exhibition. A Fellow of the R.E.S., he was also interested in local natural History and was a past President of the Bradford N.H.S.

II. THE EUPITHECIINI, OR "PUGS"

By G. PRIOR

(23 Manor Way, North Harrow, Middlesex HA2 6BZ)

I will now commence the second part of my address. It is, as you may expect, something concerning that group of geometer moths called the Eupitheciini or "Pugs".

The subject is of course so wide that it is not possible to cover it adequately in the short time available. The Eupitheciini are a large world-wide group of small macro-moths. It is generally accepted in Britain that they are comprised three genera, *Eupithecia*, *Chloroclystis* and *Gymnoscelis*. Until at least the latter end of the last century they were grouped together in the one genus *Eupithecia*, in fact Tutt always grouped them under this single genus. At the beginning of this century Karl Dietze, who was perhaps the greatest authority of all time on this group created a new genus *Calliclystis* and removed most of the genus *Chloroclystis* to it, and this system is still in use by some German entomologists. Earlier this century Meyrick revived the Hübnerian genus (*Eucymatoge*), so as to contain the species *E. subnotata*, plain pug, *E. subumbrata*, shaded pug, and *E. abietaria*, cloaked pug, with these he joined *Horisme vitalbata*, Small Waved Umber, *H. tersata*, The fern, and *H. aquata*, The Cumbrian umber. Meyrick was a good entomologist but I regard this grouping as quite absurd; it rested upon minor characteristics in the imagines and ignores the quite radical differences in larval habit and form; I think that no one today seriously regards this as a valid genus. Pugs are a difficult group and rather neglected; it is quite often said that it is almost impossible to tell them apart, and this may account for some of the neglect. They are however not all alike, they vary greatly in size, wing shape and markings; but it is true that there are small groups of three or four that resemble each other so closely that they can baffle the experts, and in fact, if taken as imagines and a little worn, one must make a genitalia examination to determine them.

I have studied the early stages of this group for some seven years or so and bred 46 of the 50 or thereabouts species in the British Isles, many of them several times so my remarks will be chiefly concerned with the early stages.

The ova vary in shape from spherical to bullet-shaped, whilst most seem to be a flattened sphere rather like a tangerine in shape. The shell is usually pitted, or perhaps it would be better to describe it as reticulated; in fact when examined under microscope many resemble nothing so much as the surface of a golf ball.

In captivity they normally pair and lay quite freely, with the exception of some six that over-winter as ova. These are *Chloroclystis rectangulata*, *C. debiliata* and *C. chloerata*, *Eupithecia pusillata*, *E. tenuiata* and *E. inturbata*. These are all tree or bush feeders and I am certain that the female requires the actual growing tree or bush so that she may secrete her ova in the crevices of the bark as they will have to remain as ova for at least nine months and escape both predators and the effect of the weather. It is not correct as is sometimes stated that *C. rectangulata* lays her ova on the flower bud of apple.

The Larvae. I have often heard entomologists, some of whom should know better, say that a thing is a "typical pug larva". This is one thing about which I will be dogmatic and say that there is no such thing. They differ completely in shape, size and habit as well as colour and markings. I think that one can safely say that there is greater diversity in the Eupitheciini larvae than in the Noctuidae. Their shapes range from the almost maggot-like to the long tubular; some taper sharply towards the head others taper towards each end; they can be short and almost square in section whilst others have a flattened appearance. Likewise, the skin can range from a waxy translucence to a well wrinkled and folded skin, from a soft velvety, to a skin that is so covered with tiny tubercles that it appears to be hoar-frosted. Some have almost no hairs at all; others have many. I have already said that the imagines can be very difficult to determine; the same applies to the larvae. Larvae of the same species do vary widely in colour and markings. The body-colour can be any of three or four colours; the markings can range from the well known arrow head or lozenge, to dorsal lines and dashes, and to no lines at all. When one beats a quite small juniper bush for the larvae of *E. pusillata* perhaps as many as thirty or forty larvae will fall onto the sheet. These will have all the variations that I have just stated, so that it is difficult to credit that they are all of the same species, and it is probable that these are the progeny of perhaps two or three females at the most. I well remember a fine piece of "Jacobean" wit, some years ago: I was sitting in the body of the hall, examining a box of pugs that Richard Dickson had kindly given to me; Stanley Jacobs was sitting next to me; he looked at them, and then lifting his glasses said "there should be a law against those things"; I can well understand what he meant. There are almost no accurate illustrations of the larvae of this group in any of the text books that are readily available to the ordinary entomologist, and of those that there are some are worse than useless. What then can one do about determining the identity of any larvae that are found or emerge from the ova of a captive female so worn as to be not readily identifiable? Colour and markings can be useful but as I have already pointed out, can be deceptive, time of emergence and foodplant can help though the latter is of little help with the polyphagous species.

The shape of the larva, the texture of its skin, whether hairy or not and if the hairs are set singly or in little cluster, the size of the head and how it holds it, these are all of vital importance. For instance one often finds two species feeding together on one plant. In the late summer *E. goossensii* and *E. nanata* can be found together on various species of ling or heather, in their early stages their body colour and markings, pink body and purplish markings are superficially very similar, but *nanata* is a rather thin and tubular creature whilst *goossensii* has all the characteristics of *absinthii*; in later stages their markings will set them apart. *E. pimpinellata* and *E. centaureata* can be found together on the Burnet Saxifrage in the autumn, *centaureata* ranges over a great variety of colour and markings and some of these resemble *pimpinellata*. I suppose one could wait and see which of the pupae are almost completely parasitised and this would almost certainly be *pimpinellata*, but a better test is of course the shape, which is quite different.

There are eleven species that I would call internal feeders, that is to say they can be found feeding inside the seed heads or capsules or in spun-up flowers but this does not mean that they cannot sometimes be found sitting openly on the foodplant. *E. abietaria* feeds inside the scales of the cones of the spruce, feeding on the unripe seeds; these larvae may be discovered by their frass according to Tutt, though I have never found them. *E. tenuiata* is usually stated in the text books to feed inside the male catkins of Sallow; I have found it here but I have also found it feeding openly upon the female catkin. *E. Hawthorthiata* feeds inside the unopened buds of wild clematis or old man's beard, the tell-tale black hole in the bud which indicates frass inside, shows that there is a larva inside, or has just left. *E. plumbeolata* is an odd creature that feeds inside the long thin corolla of cow-wheat and may be found with its hind end sticking out of the tube. I have found that the best way to obtain these is to collect a large bunch of flowers at random over a large area, divide these into several small bunches, put these into small pots of water and stand these upon a large sheet of white paper, after a few days the frass on the paper will indicate the presence and location of the larvae and they can then be quite easily seen. *E. linariata* spends most of its larval stage inside the seed capsule of the yellow toadflax and may easily be detected by the small round hole it bores near the base of the capsule, it travels from one seed head to another until pupation. *E. pulchellata* is to be found inside the corolla of the flower of the foxglove, feeding on the stamens or inside the seed capsule, but I should emphasise that the statement that one often reads about it spinning together the mouth of the corolla should not be taken too seriously if one is intent upon finding the larvae, you will miss perhaps eighty per cent of them if you look for them this way. They will certainly be found in spun-up flowers, but also in others. The best way to be sure of finding them is to gather several flowerheads and keep them in a box and examine them regularly and shake them over a sheet. You will find the larvae going from one flower to another or they will shake out of the flowers. You will find that foxglove keeps a long time before rotting or withering. *E. venosata* is not very rare, at least in the South of the country. It will be most often found in the flowers of bladder campion in preference to the other members of this plant family mentioned in the literature. They are not difficult to find; pick a large random bunch from over a wide area, keep them in water and daily shake them gently over a sheet; if they are present you will usually get several falling out. When

small they are quite black but be careful that you put them onto separate flowers that you have carefully examined, to make sure they are untenanted by other things, or you may loose most of them. The *Hadena* larvae also eat the seed-capsules of these flowers and the larvae of *venosata* at the same time.

E. campanulata is normally easy to find on the flowers of the Nettle Leaved Bell Flower. Gather a bunch of the flowers and if shaken after a day or two one will find the larvae dropping out of them; they may be safely left, unlike *venosata*. They will continue to feed in the seed heads after the flower has withered or rotted and will also eat most of the garden *Campanulas*. *C. debiliata* is an odd creature that eats the flowers of bilberry by night and during the day hides away between two leaves that it has spun together. It seems to make a different hide each day so that a bush may have several spun-together leaves with only frass but only two or three larvae. *G. rufifasciata* will in captivity prefer to feed in the flower heads of gorse or broom but it may be taken from a wide variety of other plant notably heather or ling.

All the larvae of the internal feeders seem to be able to tolerate a level of what I would call larval squalor that would cause other caterpillar species to die from disease or fungus.

The larvae of some species will resemble each other so much that other factors apart from colour and markings are needed to tell them apart. *E. abbreviata* and *E. dodoneata* I have found to be virtually indistinguishable. *E. dodoneata* is a smaller larva but this is not conclusive, they both feed on the same foodplants and may be found freely on Hawthorn. Time is the important factor; *abbreviata* feeds much earlier normally from early May to early June, whilst *dodoneata* is found until late July. *E. succenturiata* and *E. icterata* are almost indistinguishable and feed at the same time. *E. succenturiata* will be found feeding or hiding among the leaves at the bottom of the Mugwort plant, they are quite often almost black but when bred from the ova they will be found to be pink and green and resemble *icterata*. *E. icterata* on the other hand feeds mainly on the flowers of Yarrow and does not eat the leaves. *E. subfuscata* also resembles these last two but it is slightly more tapered and the dorsal lozenge is lightly different. *E. absinthiata* is a very variable creature, it will sometimes resemble *E. tripunctaria* and though it will be found on angelica, *E. tripunctaria* on the other hand will never be found feeding on ragwort, mugwort, yarrow, etc. *E. assimilata* may be best detected on its foodplant, wild hop or currant if the leaves are carefully examined. The tiny larvae eat out a large number of tiny holes so that the leaves resemble a sieve. Three larvae, *E. extensaria*, *E. phoeniceata* and *E. millefoliata*, are the most cryptic of all the pug larvae and when bred in captivity it is almost impossible to detect them on their foodplant, I have found that the frass dropped onto the paper at the bottom of their breeding box is the only indication of their presence. They illustrate perfectly that not only are the pug larvae very cryptic but sit in such a way that they make the utmost use of these colorations and markings. When one remembers the very defective vision that larvae have it poses the question how do they arrive at this.

The Eupitheciini as a group seem to show evidence of evolutionary development that has gone on amongst them. This shows itself at its most extreme among those species that inhabit the Hawaiian Islands, the larvae of which have changed from a plant to an animal diet. They are not merely canibalistic but are actually predators, catching and eating flying

insects that settle near to them. They have developed large almost crab like fore legs with which they seize their prey and hold it whilst they devour it, they also have developed the senses to detect the slightest movement caused by an insect alighting nearby. There are recorded instances of the larvae of *E. tripunctaria* seizing and eating aphids resting on the withered angelica when larvae have emerged before the new growth was available.

The group in Britain appears to be divided roughly between the primitive and advanced, with some half way. There are as always of course important exceptions. The primitives seem to be widely polyphagous eating mostly leaves though they also devour flowers. They feed voraciously, produce large quantities of frass, and take quite a long period to reach the pupal stage. It would seem that the food that they eat has a low nutritional value, thus large quantities are needed and development is slow. Their bodies are normally longer and larger as if to accommodate the greater amount of roughage. The more evolved feed almost exclusively on the flowers and seeds of plants, stamens, pistil, pollen and unripe seeds. Their life span as larvae is much shorter, as little as two weeks, for *chloerata*, as against some five months for *exiguata*, which was the extreme length of time that I have found in breeding this group in captivity. Many are internal feeders inside seed-capsules, and are much smaller, tapered towards both ends they resemble grubs or maggots. They produce little frass so it seems that their food has a high nutritional value. Some have become extremely specialised and can be found only upon one plant, they are therefore at great risk of extinction, should disease or man's desire to eradicate some plant or other that he considers injurious to his economy be carried out thoroughly. There is a small group, that has branched off, feeding upon pine, spruce, larch, juniper or cypress; these eat quite sparingly, nibbling at the needles or scales, and never devouring the whole; they produce fairly little frass so that their food seems to provide them with more nourish ment than the leaves of plants or deciduous trees. On the other hand they seldom take less than six weeks to pupation.

CORRESPONDENCE

FORESTRY COMMISSION PERMITS TO COLLECT

(from P. J. CLARKE, Secretary, Forestry Commission, 231 Corstorphine Road, Edinburgh, EH12 7AT)

(To the Hon. Sec., B.E.N.H.S.)

12th April 1979

Dear Mr. Wild,

Mr. Holmes has asked me to reply to your letter of 11th March about the collection and study of insects in Forestry Commission woodlands.

As you will know, the Forestry Commission has a responsibility for the proper conservation of wildlife within its woods. At the same time it wishes to encourage the widest possible use of the woods for educational purposes and the study of natural history. Some form of control is therefore necessary in order to protect rare species and to avoid unnecessary disturbance to all forms of wildlife.

During the past few years there has been a marked increase in the number of applications for permits to collect insects, particularly in our South Eastern Conservancy for certain woodlands where rare or local

species are known to exist. Bona fide amateur entomologists who wish to study insects or collect a limited number of specimens for themselves are normally given permission to do so in specific areas. I am afraid, however, that we have had instances where unauthorised commercial collecting of certain rare species has occurred in some areas and we have therefore had to take steps to try and prevent this.

It is helpful to us if permit holders notify local staff beforehand of their intended visits. There have been occasions when unauthorised collectors have been operating lights in woodlands well into the night which has resulted in both the police and forestry staff being alerted for the possible presence of poachers. A permit holder can avoid this sort of incident by making a telephone call to our local office.

I am afraid that your suggestion for a national or even a regional permit to enter and collect is not really practicable as the type of ownership and access arrangements are by no means the same for all our woodlands. There are conservation, research and wildlife studies going on in a number of areas as well as normal forest operations taking place.

It is worth mentioning that the Forestry Commission is in close touch with the Joint Committee for the Conservation of British Insects and an entomologist from the Forestry Commission Research Division attends their meetings. There is thus a two way exchange at a fairly high level on subjects such as sensitive areas and endangered species, and we have played a small but constructive part in preparing the Code for Insect Collecting.

I hope from what I have said above that you will be assured of our good intentions and of the need to continue with our present permit system. We wish to be as co-operative as we can. I might add that the information collected by visiting entomologists is certainly of use to us and these records and those of other naturalists are taken into consideration when producing conservation management plans.

Finally, with regard to Long Rope Wood, I understand that apart from the control of vegetation along certain highways no chemical spraying has taken place in the woods under our control for at least six years.

THOUGHTS ON INSECT CONSERVATION

By S. A. KNILL-JONES

(8 Dove Mews, London, SW5 0LE)

With reference to our discussion meeting on Thursday, I am sending you a slightly fuller account of my thoughts which I delivered then.

As an Englishman I feel that there is far too much euphoria given to the Conservation of Wild Life in this country. Nature has a remarkable propensity for fighting back. Is it not true that the New Forest Burnet (*Zygaena viciae*) (D. & S.) has returned to Scotland; the Rosy Marsh Moth (*Eugraphe subrosea*) (Steph.) to Wales; and the Olive Crescent (*Trisateles emortualis*) (D. & S.) to England after a lapse of a good many decades? Don't we tend to over- conserve when the necessity arises? Perhaps this has proved the case with the very sad loss of the Large Blue this year. One has to be very careful when fostering Nature and we see this as a lesson learnt and not to be repeated with other vulnerable species.

I feel that we as collectors should be made more responsible for conservation of our Entomological heritage. Perhaps we should become more a party of observers and breeders rather than straight forward collectors.

One female caught in the wild of a rare species will provide a more than adequate series for one's collection. In fact with luck and careful rearing the surplus imagines could be returned to the original locality thus replenishing the stock.

Without records collecting is meaningless and I suggest that we swamp that excellent establishment Monkswood with all the records that we can muster from wherever we go. In this way, with the help of careful computer programming an accurate record of the state of our rare and endangered species can be drawn up. In this way a yearly check on the rise or fall of each particular rare species can be evaluated. If a species shows a dangerous decline then there should be some kind of Red Alert and when this occurs we shall then require the services of the professional conservationists. It will be up to them to discover the cause of decline and then to offer a remedy.

I think that a special fund should be set up aided perhaps by a National Conservation Flag Day — enlighten the public of their Natural Heritage, which will be theirs more and more as leisure activities increase due to the advent of silicon chips and further mechanisation which will result in shorter working hours and earlier retirement. It seems that too much money has been spent on Nature Reserves and Field Centres which house few or or often as not no species of special interest. Surely a great deal of money has been wasted here, which could have been deployed on purchasing land that does house our Red Alert vulnerable species after which true conservation can then begin.

Finally the government should be given the power to prevent the Forestry Commission, Local Councils and other bodies from encroaching over land where there are endangered species, and to compensate farmers or land owners who present a similar problem.

Finally it is up to our educators to enlighten our children in the need for intelligent conservation and an awareness of things Natural, which will be of benefit to our green and pleasant land and future generations.

Perhaps I may add a further comment for us to share. It seems a shame that a Bill is now passing through the House of Commons via The Lords which in the main has been put together by people who are rather out of touch with the grass roots of those actively pursuing the study of Entomology and Natural History.

A NEW FOODPLANT FOR THE CLOUDED BRINDLE MOTH **(*Apamea epomidion* (Haw.) (Lep., Noctuidae))**

By G. E. HIGGS

(The Cottage, Willen, Milton Keynes, MK15 9AD)

(To The Editor, *B.E.N.H.S.*)

Dear Sir,

I was interested in the remarks which appeared in the Proceedings Vol. 12, Part 3/4, Page 113, regarding how little is known about some of the foodplants of many of our insects.

I think the biggest surprise I've had in this respect was finding two shell-pink larvae in a very rotten oak twig beneath an old tree. By the amount of frass around them I assumed that they were in fact feeding upon the decaying wood. Not knowing what the larvae were, I placed them in a shallow tin which was kept tightly closed to retain the moisture. The larvae continued to feed on the wood until they became fully fed and not only were the larvae pink but the frass also. They pupated within the twig

and eventually produced two perfect specimens of The Clouded Brindle (*Apamea epomidion* Haworth).

As the piece of wood was partly covered by grass and many low growing plants were close by, I cannot offer any suggestion as to why this unusual food was chosen.

The specimens are in my collection and the larvae were found at Loughton, North Bucks. Not a very common moth in this area.

A REVISION OF THE PANTROPICAL GENUS TATHORHYNCHUS HAMPSON (LEP.: NOCTUIDAE, OPHIDERINAE)

(with Plates I-V)

by A. H. HAYES

(Department of Entomology, British Museum (Natural History), Cromwell Road,
London SW7 5BD)

Introduction

The genus *Tathorhynchus* Hampson is revised and identification keys to the species are given. Six species are redescribed, two of which are divided into subspecies; one new species *camerounica* is described. Larvae feed on Leguminosae and the larva of *exsiccata* is figured.

Acknowledgements

In addition to acknowledging the helpful advice given to me by my colleagues at the British Museum (Natural History), I should like especially to thank Dr. T. D. Eichlin of the State of California Department of Food & Agriculture, Sacramento, for kindly mailing me preserved larvae of *exsiccata*. My thanks are due to members of the Photographic Studio of this museum, who took the majority of the photographs reproduced in the plates.

Location of material studied

All specimens are in the British Museum (Natural History), (often abbreviated to BMNH) unless otherwise stated. Dr. P. Viette, Muséum national d'Histoire naturelle, Paris (MNHN), and Dr. U. Dall'Asta, Musée Royal de l'Afrique Centrale, Tervuren (MRAC), kindly gave me access to material under their care during my visits in 1977. Unless otherwise stated all figured species are housed in the British Museum (Natural History) and have been labelled. Specimen data has been restricted to country of origin to avoid repetition.

TATHORHYNCHUS Hampson

Tathorhynchus Hampson, 1894, *Fauna Br. India* 2: xiii, 268. Type-species: *Scopula vinctalis* Walker, [1866] 1865, *List Specimens lepid. Insects Colln. Br. Mus.* 34: 1476, by original designation, but cited as '*T. vinctale* Wlk.'. (*S. vinctalis* is a junior subjective synonym of *Spintherops exsiccata* Lederer, 1855, *Verh. zool.-bot. Ver. Wien* 5 (Sber.): 204 pl. 2, fig. 12).

Xymehops Viette, 1954, *Annls. Mus. r. Congo Belge. (N.S. 40 Sci. zool.)* 1: 557. Type-species *Xymehops nigra* Viette, 1954, *ibidem* 1: 558, fig. 15, by original designation. (Synonymised by Viette, 1967, *Faune Madag.* 20 (2): 746.)

Diagnosis. Proboscis fully developed. Palpus upturned, second segment reaching about vertex of head, very broadly angled with scales in front and slightly fringed with finer scaling behind towards extremity, third segment long and fringed with scales in front; frons smooth; eye large round; antenna of male bipectinate; prothorax with long spreading oblique crest, metathorax without crest; tibiae moderately fringed with scales; abdomen dorsally flattened with slight lateral tufts of scaling towards extremity and without crests. Forewing narrow, apex rounded, the termen

evenly curved and slightly crenulate; veins 3 and 5 from near lower angle of cell; 6 from upper angle; 9 from 10 anastomosing with 8 to form the areole; 11 from cell. Hindwing with cell nearly half the length of the wing; veins 3 and 4 from lower angle of cell; 5 fully developed from middle of discocellulars; 6 and 7 from upper angle; 8 anastomosing with cell near base only.

Affinities. The genus *Tathorhynchus* has been placed by Boursin (1964, *Bull. mens. Soc. linn. Lyon*, 33: 231) in the subfamily Amphipyrrinae, but the correct placement is in the subfamily Ophiderinae. Examination of adults and larvae indicates that *Lygephila* Billberg, 1829 and *Asticta* Hübner, 1816 are the closest allied genera.

Biology. All recorded foodplants belong to the family Leguminosae. *Indigofera tinctoria* L. (tree indigo) and *Medicago sativa* L. (alfalfa or lucerne) and *Spartium junceum* (L.), (Spanish broom) are recorded as foodplants of *exsiccata*. Crumb, 1956, gives a detailed description of *exsiccata* larvae. A larval specimen of *exsiccata* housed in the collections of the State of California Department of Food and Agriculture is figured here, see Fig. 1.

Distribution. All species included in this paper are from the Afrotropical region, although *exsiccata* is also found in Europe, the Mediterranean region, the Middle East, India, U.S.A., Dominica and Argentina and as a distinctive subspecies in the Australasian region.

Species-Groups. Three species-groups are recognised. *Exsiccata* species-group where no sexual dimorphism in wing pattern is discernible. *Homogyna* species-group where males exhibit dark scaling on the veins of the hindwing. *Plumbea* species-group where males are easily distinguished from female by their dark wing coloration.

exsiccata — group

T. exsiccata exsiccata (Lederer)

T. exsiccata fallax Swinhoe

homogyna — group

T. homogyna homogyna Hampson

T. homogyna malagasy Viette

plumbea — group

T. plumbea (Distant)

T. roberti (Guenée)

T. nigra (Viette)

T. camerounica sp. n.

T. leucobasis Bethune-Baker

KEY TO MALE *TATHORHYNCHUS* BASED ON HINDWING CHARACTERS

(excluding *roberti* — Cape Verde Islands)

1. Predominantly dark brown 2
- Outer margin only dark brown 5
2. Fringe dark brown *nigra*
- Fringe straw-coloured 3
3. Straw-coloured scales forming band in discal cell area 4
- No such band present *plumbea*
4. Straw-coloured scales filling discal cell area *leucobasis*
- Straw-coloured scales reduced to thin line in discal cell area *camerounica*
5. Veins heavily dusted with dark scales Madagascar *homogyna malagasy*
- Africa *homogyna homogyna*
- Veins not heavily dusted with dark scales
 - Australasia *exsiccata fallax*
 - other regions *exsiccata exsiccata*

KEY TO FEMALE *TATHORHYNCHUS* BASED ON FOREWING CHARACTERS

1. Dark line of scaling joining orbicular to reniform marking 2
- No dark line of scaling joining orbicular to reniform marking 3
2. Basal dash extending to outer margin of wing *leucobasis*
- Basal dash not extending to outer margin of wing 6
3. Reniform rounded 4
- Reniform L-shaped 5
4. Longitudinal bands of dark striated scales present between veins ... *homogyna*
- Transverse bands of dark striated scales *camerounica*
5. L-shaped reniform marking broken *troberti*
- L-shaped reniform marking unbroken *plumbea*
6. Reniform divided into two dark spots 7
- Reniform single *nigra*
7. Prominent submarginal arrow-shaped markings *exsiccata fallax*
- No such markings *exsiccata exsiccata*

EXSICCATA — GROUP*Tathorhynchus exsiccata* (Lederer)

(Figs. 1-7, 21-23)

Spintherops exsiccata Lederer, 1855. *Verh. zool.-bot. Ver. Wien*, 5: (Sber.): 204, pl. 2, f. 12.

♂ ♀. This species is distinguished by the prominent dark basal dash on the forewing. A similar line joins creamy white orbicular to creamy white reniform, the latter containing two dark patches of scaling. Dark brown scales bordering outer margin of both wings. Veins of hindwing with dark brown scales.

Distribution. Europe, Mediterranean countries, Middle East, Africa, India, Australia, Norfolk Island, New Zealand, U.S.A., Dominica, Argentina. Two subspecies are recognized, separable on wing pattern and genitalic characters.

Tathorhynchus exsiccata exsiccata (Lederer)

(Figs. 1-5, 21 and 22)

Spintherops exsiccata Lederer, 1855. *Verh. zoo.-bot. Ver. Wien*, 5 (Sbr.): 204, pl. 2, f. 12. Holotype ♂ Lebanon, Beirut, MNHU Berlin. Examined.

Scopula vinctalis Walker, 1865. *List Specimens lepid. Insects Colln. Br. Mus.*, 34: 1476. Syntypes. BMNH. Examined.

Platysenta angustiorata Grote, 1882. *Bull. U.S. Geol. & Geog. Surv. Terr.*, 6: 584. Holotype ♂ U.S.A., Maine. USNM. Examined.

Tathorhynchus [sic] *exsiccata* Lederer: Townsend, 1936. *Journal E. Africa & Uganda N.H.S.*, 13: 125. [Larva, pupa, foodplant.]

Tathorhynchus exsiccata Lederer, Forbes, 1954. *Lepidoptera of New York and neighboring States*, Memoir 329 Cornell University Agricultural Experiment Station, Ithaca. *Mem. Cornell Univ. agric. Exp. Stn.*, 329: 376.

Tathorhynchus angustiorata Grote, Crumb, 1956. *The Larvae of the Phalaenidae*. Tech. Bulletin. USDA 1135: 277. [Larva.]

Tathorhynchus exsiccata greuteri Koutaftikis, 1973. *Annls. Mus. goulandrdis*, 1: 203, pl. 31, fig. 6, **new synonymy**.

The nominate subspecies is distinguished by the absence of prominent submarginal arrow-shaped markings. See Figs. 2 and 4.

Male genitalia. See Figs. 21 and 22. Uncus dilated apically.

Larvae (see Fig. 1) recorded on alfalfa or lucerne (*Medicago sativa* L. — Leguminosae) and indigo (*Indigofera tinctoria* L. — Leguminosae). Introduced to the Americas. Dr. C. R. Gunn et al, 1978, *U.S.D.A. Technical Bulletin* 1574 discuss the introduction of the foodplant *Medicago sativa* L. to the Americas.

Distribution. Wide distribution Africa and India, Seychelles, Mediterranean countries and Middle East, vagrant to N. European countries. There are several well documented records for the British Isles which Mr. R. F. Bretherton is recording in *Moths and Butterflies of Great Britain and Ireland*. Introduced to U.S.A., Dominica and Argentina.

Tathorhynchus exsiccata fallax Swinhoe

(Figs. 6, 7 and 23)

Tathorhynchus fallax Swinhoe, 1902. *Ann. Mag. nat. Hist.* (7) 9: 423. Holotype ♀ Australia. Roebourne, BMNH. Examined.

Tathorhynchus exsiccata fallax Swinhoe Holloway, 1977. *The Lepidoptera of Norfolk Island*, W. Junk: The Hague. Series Entomologica 13: 94 to subspecific status.

♂ ♀. Larger than the nominate subspecies, forewings paler, greyer, with the hindwings less prominently and broadly dark-bordered. Submarginal arrow-shaped, dark markings present on the forewing. Figs. 6 and 7.

Male genitalia. Fig. 23. Valve broader at centre than nominate subspecies.

Distribution. Australia, New Zealand and Norfolk Island.

HOMOZYNA — GROUP

Tathorhynchus homozyna Hampson

(Figs. 8-11 and 24)

Tathorhynchus homozyna Hampson, 1902. *Ann. S. Afr. Mus.* 2: 394.

♂. Prominent dark mesothorax. Forewing with straw-coloured orbicular; reniform a rounded patch of dark scales; wing irrorate with dark brown scales forming transverse lines across wing. Terminal band dark. Hindwing heavily dusted with dark scales on veins.

♀. Wing pattern similar to male but lacking the heavy dusting of dark scales of the veins on the hindwing.

Distribution. Africa and Madagascar.

Two subspecies are recognized.

Tathorhynchus homozyna homozyna Hampson

(Figs. 8, 9 and 24)

Tathorhynchus homozyna Hampson, 1902. *Ann. S. Afr. Mus.* 2: 394.

Holotype ♂. S. Africa, Natal. BMNH. Examined.

Tathorhynchus homozyna Hampson, Townsend, 1938. *Journal E. Africa & Uganda N.H.* 13: 176. [Larva, pupa, foodplant.]

The nominate subspecies lacks the angular margins of the wings and the accentuated apex of the forewing.

Male genitalia. See Fig. 24. Characteristic short rounded valve.

Larvae feed on *Indigofera*.

Distribution. Angola, Ethiopia, Kenya, Malawi, Mozambique, Zimbabwe-Rhodesia, Rwanda, S. Africa, Sudan, Tanzania, Uganda, Zaire.

Tathorhynchus homozyna malagasy Viette

(Figs. 10 and 11)

Tathorhynchus homozyna malagasy Viette, 1967. *Faune Madagascar* 20 (20): 747. Figs. Holotype ♂. Madagascar, Tananarive. MNHN, Paris. Examined.

♂. Similar to nominate subspecies, but angle of outer and costa of forewing more acute. See Fig. 10.

♀. Similar to nominate subspecies. Somewhat smaller. See Fig. 11.

Distribution. Madagascar.

PLUMBEA — GROUP

Tathorhynchus plumbea (Distant)

(Figs. 12, 13 and 25)

Toxocampa plumbea Distant, 1898. *Ann. Mag. nat. Hist.* (7) 1: 221. Holotype ♂. S. Africa, Pretoria. BMNH. Examined.

Tathorhynchus plumbea Distant, Pinhey, 1975, *Moths of Southern Africa*, Tafelburg, Cape Town 226. Pl. 62, fig. 1115a ♂ fig. 1115b [Misidentification ♀ *exsiccata* figured as *plumbea*.]

♂. Wings predominantly dark brown. Terminal fascia of dark brown scaling. Fringe of outer margins and base of wings straw-coloured. See Fig. 12. Male genitalia. See Fig. 25. Distinctive costal margin of valve.

♀. Reniform characterized by unbroken L-shaped patch of dark scales. Terminal bands of dark scaling. See Fig. 13.

Distribution. Lesotho, Malawi, Mozambique, S. Africa.

Tathorhynchus troberti (Guenée)

(Fig. 14)

Toxocampa troberti Guenée, 1852. In Boisduval & Guenée, *Hist. nat. Insectes* (Lepid.) 6: 429. Cape Verde Islands. Coll. Feisthamel. Type not traced.

♂. Not known.

♀. Similar to *plumbea* female. Reniform L-shaped, dark scaling interrupted at angle. See Fig. 14.

Distribution. Cape Verde Islands.

Tathorhynchus nigra (Viette)

(Figs. 15, 16 and 26)

Xymehops nigra Viette, 1954. *Annls. Mus. Congo belge*. (N.S. in 4°) Sci. Zoo. 1: 558 figs. Holotype ♂ Madagascar, Tananarive, MNHN, Paris. Examined. *Tathorhynchus nigra* Viete, 1967. *Faune Madagascar* 20 (2): 746.

♂. Wing excurved at anal-angle. Metallic dark brown wings relieved by straw-yellow orbicular and reniform. Outer marginal fringes dark. See Fig. 15.

Male genitalia. Characteristic valve with distinctive patch of setae towards apex of valve. See Fig. 26.

♀. Forewing with dark line extending from orbicular spot to reniform and with prominent basal dash. See Fig. 16.

High altitude species.

Distribution. Madagascar. 2,250 m.

Tathorhynchus camerouica sp. n.

(Figs. 17, 18 and 27)

♂. Similar to *plumbea* in basic coloration. Separated by the straw-coloured streak in the discal cell of the hindwing. See Fig. 17.

Genitalia. Distinctive uncus broadest at angle. See Fig. 27.

♀. Forewing. Reniform crescent-shaped. Irrorate with dark mottled scales forming transverse bands across wing. See Fig. 18.

High altitude species.

Distribution. Cameroun. 6,350-8,100 ft. Holotype male: Mt. Cameroon: Mann's Quelle 7,400 ft. 3.ii.1932. M. Steele. B.M. 1934-240. 36 partytypes — similar data. Onyanga 8,100 ft. and Musake 6,350 ft.

Tathorhynchus leucobasis Bethune-Baker

(Figs. 19, 20 and 28)

Tathorhynchus leucobasis Bethune-Baker, 1911. *Ann. Mag. nat. Hist.*, 7: 538. Holotype ♂ Kenya, Nairobi. BMNH. Examined.

♂. Similar forewing to *plumbea* and *camerounica*. Discal cell area of hindwing filled with straw-coloured scales. See Fig. 19.

Male genitalia. Distinctive pointed apex to valve. See Fig. 28.

♀. Forewing. Basal dash extending to outer margin of wing. Dark line of scaling joining orbicular to reniform. See Fig. 20.

Distribution. Ethiopia, Kenya, S. Africa, Sudan, Tanzania.

Crypsotidia glaucata (Holland) **com. nov.**

Eublemma glaucata Holland, 1897 in Donaldson Smith's *Through unknown African Countries*. Edward Arnold, London & New York: 415. Sheikh Husein, Somaliland. Holotype female examined, Carnegie Museum, Pittsburgh, Hampson.

placed this species in *Tathorhynchus* in his manuscript notes on Ophi-deinae. From external characters and genitalic evidence it should be placed in the genus *Crypsotidia* Rothschild, 1901 (Catocalinae).

A HERMAPHRODITE LARGE BLUE (MACULINEA ARION (L.) — LEP., LYCAENIDAE)

(with Plate VIII, fig. 2 and three text figures)

by E. P. WILTSHIRE

(Wychwood, High Road, Cookham, Berks., SL6 9JS)

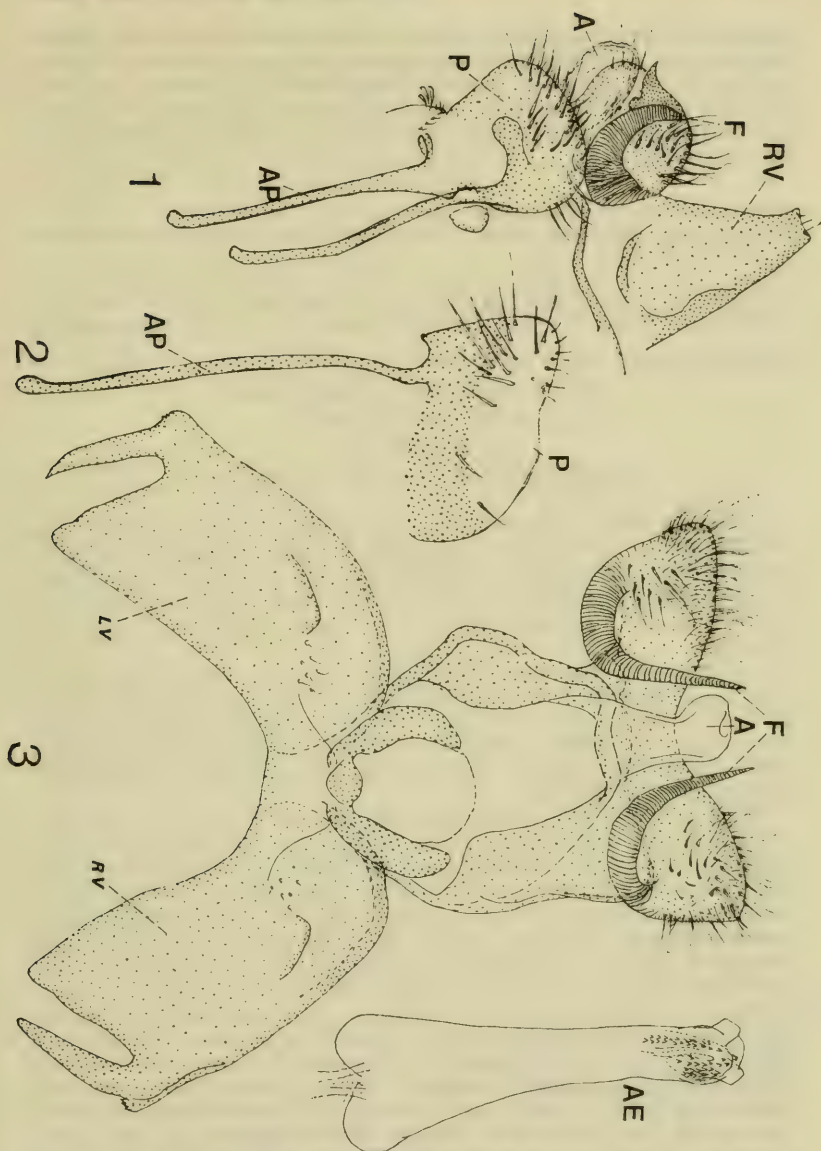
In June 1973 an overseas field meeting in Normandy was arranged, held, and duly reported by the leader, L. F. Crick (in the Society's Proceedings Vol. 6, Pt. 4, p. 120). Immediately after this society venture, my wife and I accompanied W. H. T. Tams and Leslie and Marjorie Crick on a more private vist to Pralognan-la-Vanoise, Savoie, to which an article by J. Bourgogne in 1962 had drawn our attention. In view of the fairly comprehensive account by J. Bourgogne (1973) of the lepidoptera of this wonderful locality, there is no need to detail here our various captures.

But it now seems worth while to illustrate and briefly report perhaps the best of my Pralognan catches, namely a gynandrous example of *Maculinea arion* (L.) subsp. *delphinatus* Fruhst., which I took on the morning of June 30th at c. 1,600 m above Pralognan on the Doron Chavière valley slopes, for I do not recall having seen a similar example of this species published.

It is usual for hermaphrodite lepidoptera to combine the more obvious characters of the two sexes, and in cases of halved gynandromorphs the genitalia seldom are as perfectly halved as the wings or antennae, but usually show a mixture of parts of the two sexes in which one or the other predominates; and I found, when I examined this specimen later in 1973, that the genitalia were about two thirds female to one third male: the anal papillae, though smaller than in the normal female, appeared to be both present but the right hand one had a male falx attached and might have been a male subuncus, as both the posterior apophyses appeared attached to the left hand papilla; these apophyses were shorter than in the normal female. The right tegumen was present and was accompanied by a small male valve lacking the normal distal process; the male juxta and aedaeagus were lacking but a female ventral plate and ostium were present, though abnormal.

The hermaphrodite was taken flying in a slow fluttering fashion, probably due to the disproportionate size of the female wing compared with the male right wing. Presumably mating would be out of the question for such an abnormal specimen.

The reported extinction of the British Large Blue populations is of course to be regretted but should be viewed in a wider perspective. As Henry Beuret (1957: 241) pointed out, the species prefers rather dry localities with stands of the wild thyme, on which it oviposits; in Switzerland it occurs on such from the plain (c. 250 m) to the snow-line (c. 2,500 m). It inhabits most of Europe, though dying out in the British Isles, and severely localised in Spain, except in the Pyrenees. Its most extensive



Figs. 1, 2 and 3: Genitalia of male and parts of genitalia of a female and an androgynous specimen of *Maculinea arion* (L.) *delphinatus* (Ob.) all taken at Pralognan, Savoy, France) (on same scale): 1. gynandrous example, omitting vaginal plate and ostium; 2. normal female anal papilla, one side only; 3. complete male genitalia with aedeagus separated. (A = anus; AE = ♂ aedeagus; AP = ♀ posterior apophyses; F = ♂ falx; LV = left ♂ valve; P = ♀ anal papilla (one side only); RV = right ♂ valve.

distribution is in the U.S.S.R., where it ranges through Russia to Transcaucasia, and thence through the endless steppes of Southern Siberia towards the Far East. In Amurland, Beuret doubts whether the form *arionides* Standinger is really specifically distinct; he stresses its comparatively great adaptability and variability on the diverse habitats of its European range.

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 Bourgogne, J., 1973. *Premier inventaire des Macrolépidoptères et Pyralides du Parc National de la Vanoise*. (Trav. scient. du Parc. nat. de la Vanoise: 3. With two plates (Caption for plate vii).

INTERGENERIC MATINGS OF ZYGAENA AND PROCRIS IN MOROCCO (LEP.: ZYGAENIDAE)

(with Plate VI, fig. 2)

TORBEN B. LARSEN

(23 Jackson's Lane, Highgate, London, N.6)

In the course of a recent business trip to Morocco (June 1979), I was fortunate enough to be able to pay a half day visit to the famous entomological locality of Oukaimeden in the High Atlas at 2,600 m some 75 km from Marrakech. In addition to chalking up a remarkably comprehensive list of butterflies, I noted some unusual sexual behaviour among the Zygaenidae.

In a small side valley near the ski resort of Oukaimeden I found *Procris mauretanica* Naufock to be extremely common. The population density was much higher than I have ever seen in the genus *Procris*. Interspersed with the *Procris* were isolated colonies of *Zygaena trifolii* (Esper) (ssp. *tizeragis* Wiegel) with a distinctly low population density compared to normal conditions among the *Zygaena*.

To my surprise I came across a resting couple of a male *Procris mauretanica* in copula with *Zygaena trifolii* sitting on a straw of grass. I lifted the couple by holding the antennae of the female to reassure myself that they were well and truly coupled and on being satisfied that they were, exerted the necessary force to separate them. They were strongly linked despite the great difference in size and complexity between the male genitalia of *Procris* and *Zygaena*. At this point I was rather cross with myself for not having bothered to walk the few kilometres back to the car in order to fetch my camera. I hardly believed my eyes when a few minutes later I found another similar couple in copula and this time I did fetch the camera to take the picture shown on the plate. While engaged in photography a third intergeneric mating took place just next to me. It happened fast and was totally to the point. The flying male *Procris* courted a seated *Zygaena* for less than twenty seconds before alighting and successfully mating; half a minute later I was able to lift them by the antennae though unfortunately they separated in the killing bottle.

I am aware that interspecific matings are fairly frequent among the *Zygaena* and I should not be surprised if intergeneric mating has been recorded previously as well. However, to meet with three identical cases in the course of an hour and actually to observe one of them happening is surely unique. The following factors were perhaps — but only perhaps —

among those responsible. The weather was quite dull and I did not see a single specimen of *Zygaena* spontaneously on the wing and there were in any case relatively few about. On the other hand the *Procris* remained active and they were more numerous over a large area than I have ever seen a species of *Procris* anywhere else. The chances of a male *Procris* finding an unfertilised, uncourted *Zygaena* female must have been considerably higher than normal.

My gratitude is due to W. G. Tremewan for the identification of the moths involved and to Sue Perl for providing the necessary moral support on a difficult mission.

THE ECOLOGY AND DISTRIBUTION OF THE PSEUDOSCORPION *DENDROCHERNES CYRNEUS* (L. KOCH) IN GREAT BRITAIN

(with Plate VI, fig. 1, and map)

by PHILIP E. JONES

(Institute of Terrestrial Ecology, Monks Wood Experimental Station, Abbots Ripton, Huntingdon, Cambs.)

INTRODUCTION

Dendrochrnes cyrneus was discovered in Corsica about 1869 or 1870 by Eugène Simon. He sent it to Ludwig Koch at Nürnberg, who described and named it as new to science in 1873. The species was established as British by the Rev. O. Pickard-Cambridge on a specimen found in Sherwood Forest by Dr. G. W. Chaster of Southport in 1900 or 1901. Westwood (1838) records capturing 'the largest species which I have hitherto seen' under the bark of trees in Windsor Forest, and this may possibly be a reference to *D. cyrneus*, at that time unknown to science.

DISTRIBUTION

The species is widely distributed throughout Europe, occurring in England, France, Germany, Scandinavia (as far north as about 64° 20' N), Poland, Russia, Romania, Bulgaria, Hungary, Austria, Albania, Italy, Corsica, Canary Islands, also in Anatolia, Cyprus and Algeria. It is found in native woodland under the bark of old conifers and deciduous trees and also in the galleries of longhorn beetles and bark beetles.

In Great Britain, *D. cyrneus* has been recorded from only seven sites (all in England), viz.:— Sherwood Forest, Richmond Park, Windsor Forest/ Great Park, Castor Hanglands National Nature Reserve and Eye (both near Peterborough), Maisemore (Gloucestershire) and Blenheim Park (Oxfordshire) (Fig. 1). At the present time viable populations are only known to exist in Sherwood Forest, Richmond Park, Eye and Blenheim Park.

RECORDS OF *DENDROCHERNES CYRNEUS* IN ENGLAND

Sherwood Forest

October, 1906:— Seven adults, five immature specimens taken by H. Wallis Kew in Birklands and Bilhaugh under rather close-fitting bark of dead standing oak trees. June 1912:— Taken by A. Randell Jackson in the same locality. 1912:— Two ♀ found attached to the longhorn beetle, *Saperda scalaris* (L.), taken from birch foliage (C. J. C. Pool). 1 July 1978:— One ♂, one ♀ under bark of fallen branch of partly-dead oak tree just outside Visitor Centre. Grid ref. 43/62586782 (L. Bee). 14 July 1978:— One tritonymph under bark of fallen branch of live oak tree near Visitor Centre. Grid ref. 43/62676762 (L. Bee). 18 September 1978:— Two ♂, one ♀ under very dry rotten wood of dead oak tree trunk, Bilhaugh. Grid ref. 43/639694 (P. E. Jones). 21 September 1978:— one ♂ under close-fitting bark of partly-dead oak tree, Bilhaugh (P. E. Jones).

Richmond Park

Under rather close-fitting bark of dead or partly-dead oak trees (H. W. Kew 1911). June 1907:— Beneath the bark of old oak trees — one behind a large

piece of *Polyporus* (W. H. Bennett). June 1913 and June 1914:— Two, attached to longhorn beetles *Phymatodes testaceus* (L.). (One to an antenna of one, the other to a femur of another.) (H. W. Kew). Recorded in 1924 by H. St. J. K. Donisthorpe. 4 October 1946:— Four specimens (A. E. Ellis). 11 June 1949:— Underneath the bark of a recently fallen birch tree (J. L. Cloudsley-Thompson). 28 August 1978:— Three ♂, one ♀, one deutonymph under the bark of an old dying oak tree. Quarter mile west of Robin Hood Gate. Grid ref. 51/207723. (A. J. Rundle).

Windsor Great Park

Under rather close-fitting bark of dead or partly dead oak trees (H. W. Kew 1911). April 1970:— One tritonymph in decaying beech trees with *Chernes cimicoides* (F.) and *Allochernes wideri* (C. L. Koch). (G. Legg).

Castor Hanglands (near Peterborough)

29 August 1954:— Seven specimens from beneath bark of dead standing oak tree (H. E. Henson). 27 July 1963:— ? one ♀ ? collected by W. Russell.

Little Wood, Eye, near Peterborough

19 June 1968:— Four ♂, one ♀ with eggs, under oak bark (W. Russell).

22 July 1969:— Four adults under bark of dead oak tree, with *Chernes cimicoides* (P. D. Gabbutt/P. E. Jones). 24 August 1976:— Two ♂, one proto-, three deuto-, one tritonymph in rotten wood from inside trunk of dead oak tree, together with *Chernes cimicoides* (P. E. Jones). 26 September 1977:— Six adults from under bark of dead and partly-dead oak trees and partly-dead elm (P. E. Jones). 20 June 1978:— Three adults under bark of dead oak (P. E. Jones).

Maisemore, Glos.

9 September 1957:— One specimen in wood débris from hole in damaged oak (R. S. George).

Blenheim Park, Oxon

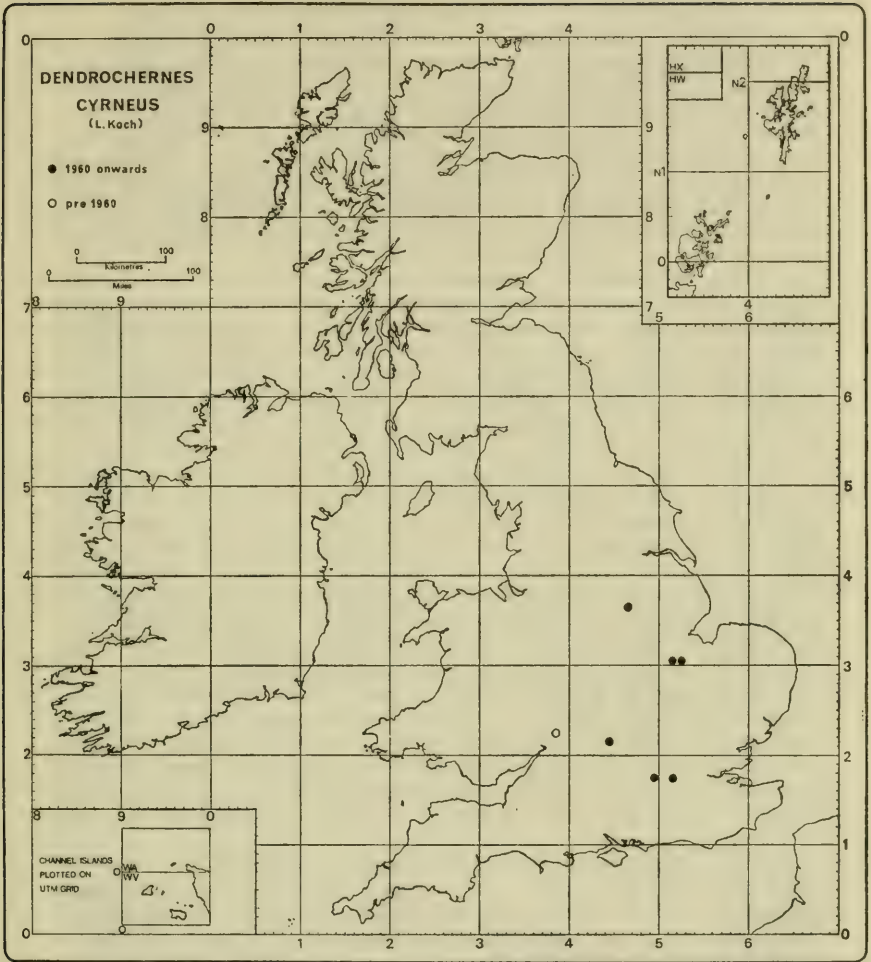
26 July 1978:— One ♀ under bark of rotten oak (C. Johnson).

LIFE HISTORY

As well as being the largest British species of pseudoscorpion (attaining a length of about 4 mm), *D. cyrneus* is also probably the rarest British species. Precise information about the life history of pseudoscorpions is usually dependent on quantitative sampling over a period of years (Weygoldt 1969). This method is impracticable for *D. cyrneus* since at most sites it is only found in very low densities. Certain conclusions can be drawn from evidence provided by the literature and by the various records of capture of the species.

Pairing has been observed by Kew (1912) in culture specimens during April/May and July/August. Evidence to support the occurrence of pairing during the same months in the 'wild' is provided by the presence of a female carrying eggs in June (1968) and the presence of all nymphal stages in August (1976) (at Eye). The occurrence of two specimens attached to longhorn beetles in Richmond Park in June (1913/1914) also supports this view, since phoretic behaviour is closely linked with the restlessness and intense hunger experienced particularly by gravid females (Jones 1978).

Pseudoscorpions carry their eggs and nourish the embryos. The female builds a silken chamber and retreats into it until the protonymphs hatch. The female collected at Eye on 19th June 1968 deposited her eggs as soon as she was placed in a culture box, probably because she was disturbed. On 22nd July she was found to have made a silken chamber on the side of the box and to be carrying another batch of eggs. She left the chamber on 1st August leaving the egg sac inside the chamber. The eggs did not develop. Before the pseudoscorpion died on 17th September she had produced and deposited four sacs of eggs, none of which developed.



Adult males and females have been found into October but no specimens have been found from November-March, suggesting that the species may be in hibernation. Kew (1906) records finding two adults in silken chambers (undoubtedly hibernation nests) in October in Sherwood Forest. He also found five adults that were free-living, on the same occasion.

The species is distributed phoretically on longhorn beetles (Beier 1963) which are wood-feeding insects. However, there are only two records of this for England (both old). The adult of *Phymatodes testaceus*, one of the species concerned, occurs in very much the same habitat as *D. cyrneus* — on old oak and beech logs, in oak branches and under oak bark.

HABITAT

Dendrochernes cyrneus is apparently restricted to ancient woodland/forest, of which there is comparatively little left in Britain today. Even in Kew's day the species was quite rare. Writing in 1906 he says: 'It lives — perhaps exclusively — under the bark of old partly-dead or dead standing trees, and appears to be a member of the old forest fauna of Europe and northern Africa. It is regarded as a rare species, and is now no doubt much scarcer than formerly, especially in a country like England, where primitive forest-land in which the old trees have been permitted to stand and decay has long been of limited extent and widely scattered'.

A study of habitats in Sherwood Forest and in Little Wood, Eye, indicate that *D. cyrneus* prefers decaying trees. Specimens have been found on completely dead trees, partly dead trees and on branches which have fallen off live trees and started to decay. All the sites in England where *D. cyrneus* has been found can be classified as ancient woodland sites, but not all the trees on which the species has been found are ancient. For instance, at Eye there has been woodland on the site since at least 1540, but few, if any, of the trees are more than 130 years old (Jones 1979).

The species of tree colonised does not seem to be important. Specimens have been found on oak, beech, birch and elm in this country. In Finland and Norway specimens have been found under the bark of pine and spruce, often in the half-rotten (but still living) trunks (Ellingson 1903; Kaisila 1949). Duffy (1952) states that, in his experience, the successful development of longhorn beetles (on which *D. cyrneus* is phoretic) depends to a far greater extent on the nature and condition of the wood, i.e. thickness of bark, moisture content, state of decay, than on the species of tree concerned. This is also probably true for the successful development of *D. cyrneus*.

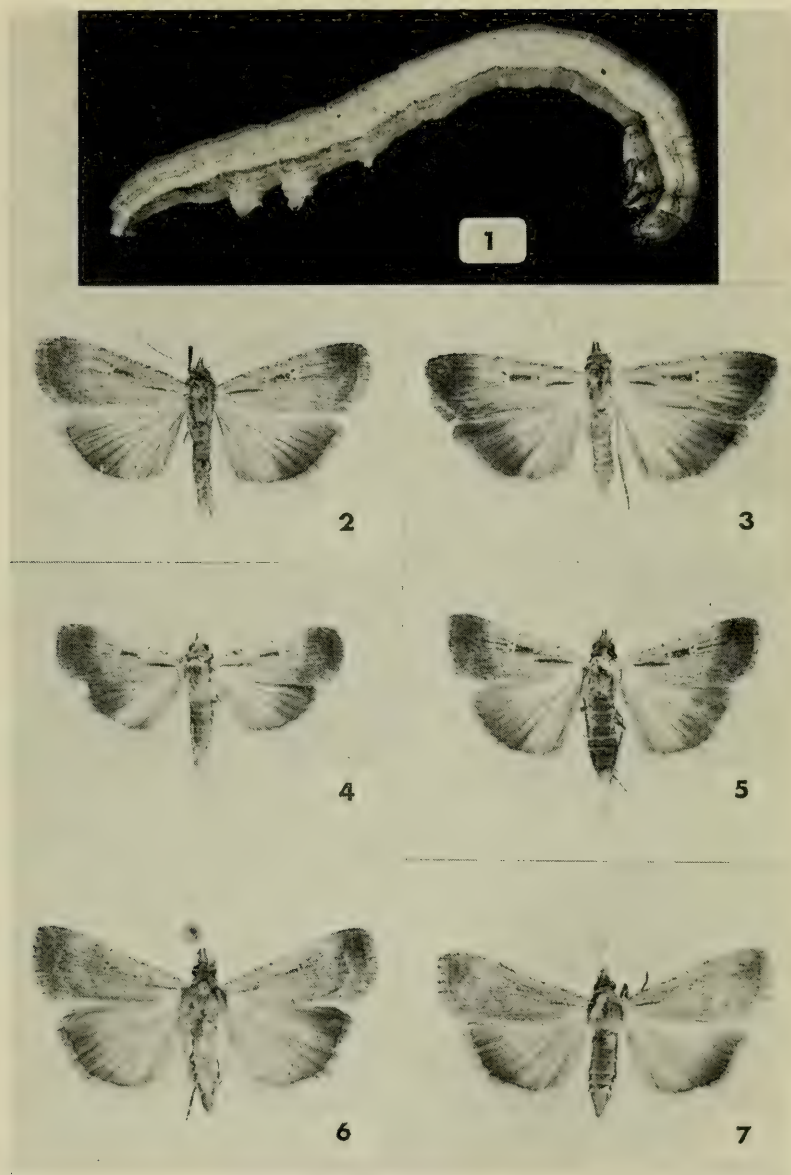
Evidence suggests that *D. cyrneus* is found at all heights on the tree, unlike *Chernes cimicoides* (F.), another pseudoscorpion species associated with ancient woodland, which Beier (1963) records as performing the lower part of the tree trunks. One of the branches in Sherwood Forest on which specimens were found in 1978 must have fallen about 25 ft. It is possible that the branch was colonised after it had broken off, but this does not seem very likely.

Within the tree, specimens have been found on the underside of pieces of loose or easily-removed bark, and, on trees where the bark had already disappeared, under pieces of very dry (but not powdery), light brown sapwood. In many cases the sapwood was broken up by beetle galleries or cracked by the action of the weather.

Further investigations into the characteristic of the microhabitat and also the food preferences, life history and means of dispersal of *Dendrochernes cyrneus* will need to be made to ensure adequate measures are taken for its protection and survival in the future.

ACKNOWLEDGEMENTS

I am indebted to the late Prof. Dr. M. Beier of the Natural History Museum, Vienna, for providing many useful literature references and to the various people who have provided me with records of *D. cyrneus* and who are acknowledged in the text after the appropriate record(s).



1. Larva on Alfalfa, 17.ix.1959. Seely, Imp. Co., California (x 3.5). Department of Food & Agriculture, State of Colifornia. *Tathorhynchus exsiccata exsiccata* (Lederer).

2. *Tathorhynchus exsiccata exsiccata* (Lederer) ♂ Ethiopia (x 1½). 3. idem ♀ Ethiopia (x 1½). 4. idem ♂ India (x 1½). 5. idem ♀ India (x 1½). 6. *T. exsiccata fallax* Swinhoe ♂ Australia (x 1½). 7. idem ♀ Australia (x 1½).



8. *T. homogyna homogyna* Hampson ♂ Kenya ($\times 1\frac{1}{2}$). 9. *idem* ♀ Kenya ($\times 1\frac{1}{2}$).
 10. *T. homogyna malagasy* Viette ♂ Madagascar ($\times 1\frac{1}{2}$). 11. *idem* ♀ Madagascar
 ($\times 1\frac{1}{2}$). 12. *T. plumbea* (Distant) ♂ S. Africa ($\times 1\frac{1}{2}$). 13. *idem* ♀ S. Africa ($\times 1\frac{1}{2}$).
 14. *T. troberti* (Guenée) ♀ Cape Verde Islands ($\times 1\frac{1}{2}$).



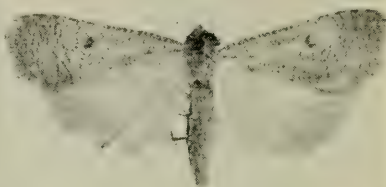
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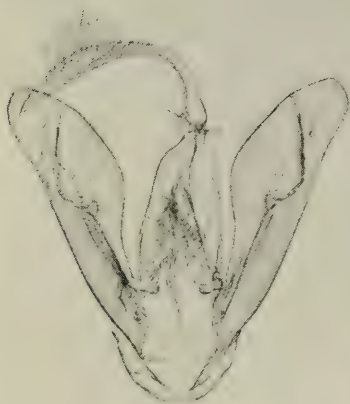


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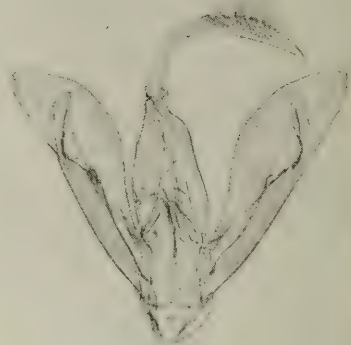


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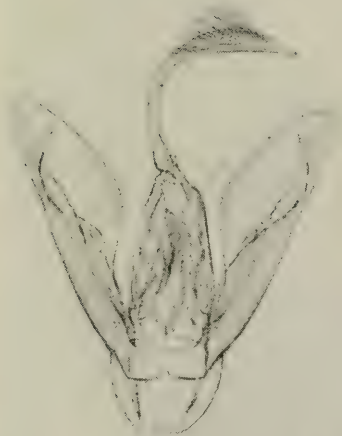
15. *T. nigra* (Viette) ♂ Madagascar (x 1½). 16. idem ♀ Madagascar (x 1½).
 17. *T. camerounica* sp. n. ♂ Cameroun (x 1½). 18. idem ♀ Cameroun (x 1½).
 19. *T. leucobasis* Bethune-Baker ♂ Kenya (x 1½). 20. idem ♀ Kenya (x 1½).



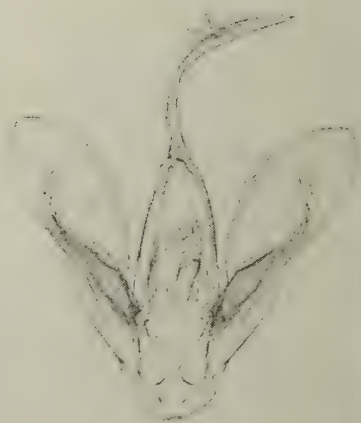
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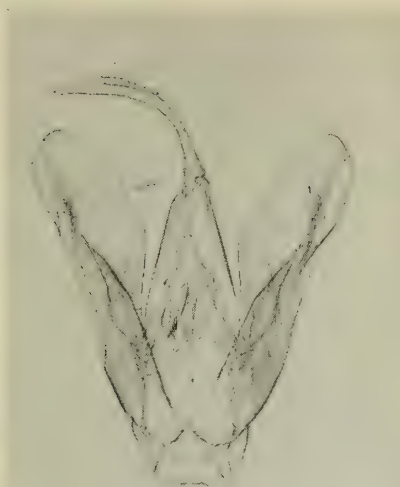
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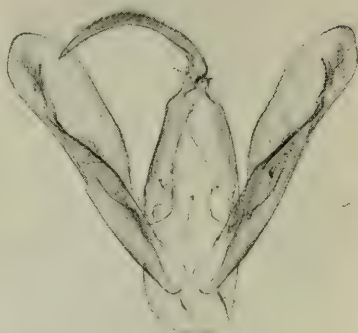
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MALE GENITALIA (AEDEAGUS REMOVED)

21. *T. exsiccata exsiccata* (Lederer) Egypt. B.M.N.H. Noct. Slide 8990 ♂.
 22. idem U.S.A. B.M.N.H. Noct. Slide 9706 ♂. 23. *T. exsiccata fallax* Swinhoe.
 Australia. B.M.N.H. Noct Slide 9704 ♂. 24. *T. homogyna homogyna* Hampson.
 S. Africa. B.M.N.H. Noct. Slide 8992 ♂.



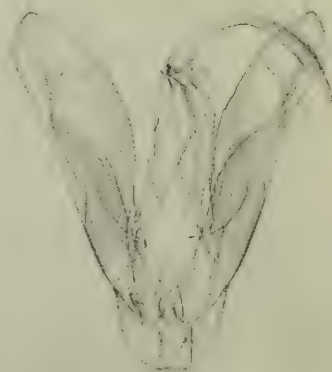
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25. *T. plumbea* (Distant). S. Africa. B.M.N.H. Noct. Slide 8994 ♂. 26. *T. nigra* (Viette). Madagascar. B.M.N.H. Noct. Slide 9709 ♂. 27. *T. camerounica* sp. n. Cameroun. B.M.N.H. Noct. Slide 9726 ♂. 28. *T. leucobasis* Bethune-Baker. Kenya, B.M.N.H. Noct. Slide 8998 ♂.



Fig. 1. *Dendrochermes cyrneus* (L. Koch) on decaying oak wood. (Photo: J. L. Mason, Nature Conservancy Council.)



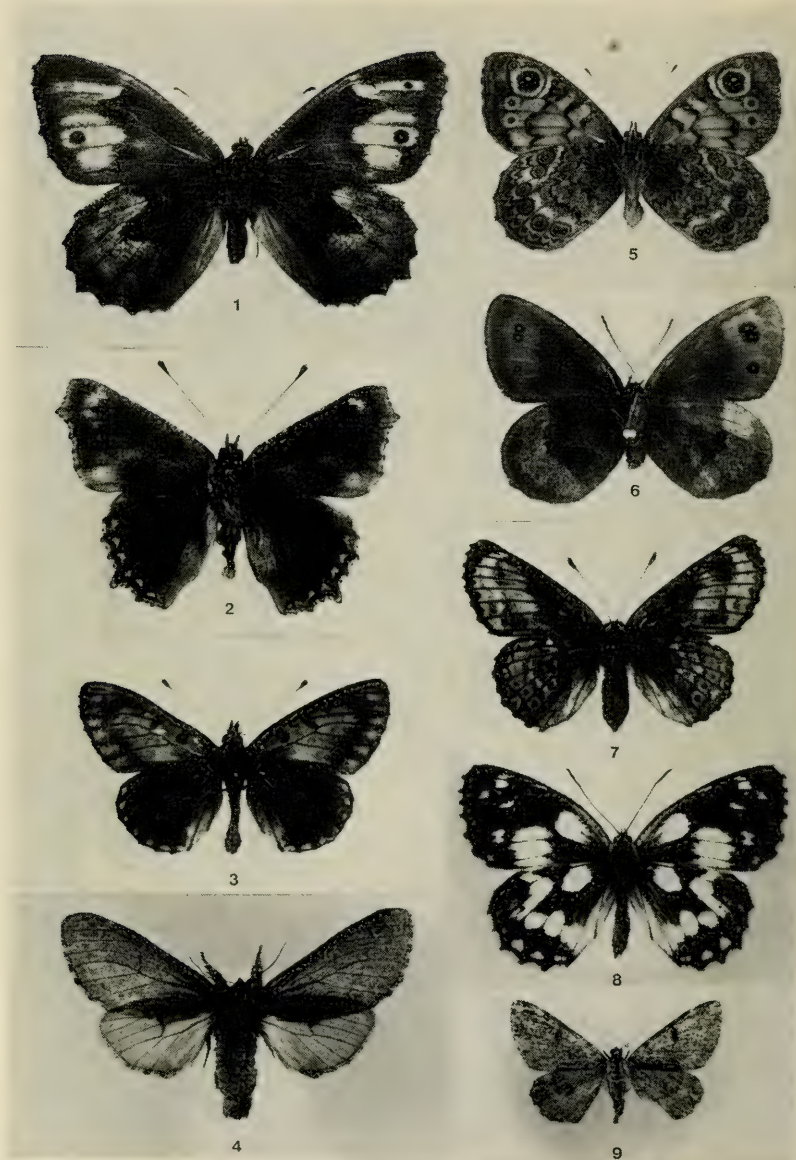
Fig. 2. Intergeneric mating: *Procris mauretanica* Naufock ♂ and *Zygaena trifolii* (Esper) ♀, photo in the field by T. Larsen.



Fig. 1. Dr. C. G. M. de Worms.



Fig. 2. Large blue, bilateral gynandromorph, photo E. P. Wiltshire.



ANNUAL EXHIBITION

Fig. 1. *Hipparchia semele* (L.) ab. (D. B. Tyler). 2. *Aglais urticae* (L.) ab. (temperature experiments) (A. D. M. Russwurm & H. G. M. Middleton). 3. *Boloria selene* (D. & S.) ab. (B. D. Fensome). 4. *Notodonta torva* (Hübner) ♀ (M. Hadley). 5. *Lasiommata megera* (L.) ab. *croesus* (Staud.) (A. S. Harmer). 6. *Erebia aethiops* (Esp.) mixed gynandromorph (C. E. Pearce). 7. *Melitaea cinxia* (L.) ab. (temperature experiments) (R. W. Watson). 8. *Melanargia galathea serena* Verity ab. *craskei* Tubbs (R. Revels). 9. *Alcis jubata* (Thunb.) ab. (R. Hayward).

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OBITUARY

**BARON CHARLES GEORGE MAURICE DE WORMS,
M.A., Ph.D., F.R.I.C., F.L.S., F.R.E.S., M.B.O.U.**

Charles de Worms died suddenly in his house at Horsell, Surrey on 10th October 1979, at the age of 76. His title descended from his great-uncle, who was made an hereditary baron of the Austrian Empire in 1871 and was granted permission to use the title in the British Empire in recognition of his family's services in development of tea planting in Ceylon. Charles was a King's Scholar at Eton and a member of King's College, Cambridge, where, after winning the Drewitt Prize for Agricultural Chemistry he took his first degrees; his Ph.D. came in 1934 from London University with a thesis on orthodiphenyl ethers, on which he later published papers in the *Journal of the Chemical Society*. Afterwards he worked as a research chemist in the Institute of the Royal Cancer Hospital, and also on the analysis of food and drugs. From 1940 to 1944 he was at the Porton Experimental Station, latterly in charge of one of its chemical research laboratories.

Charles' interest in Lepidoptera began in his boyhood and he soon became an enthusiastic and successful collector. He was elected president of this Society (then the "South London") as early as 1933; in its centenary year 1972 he gave a fascinating talk, which was printed in the Proceedings, largely about collecting before the war. In the thirties, too, he commenced his lifelong practice of writing and publishing annual accounts of his own collecting, which are now a valuable source of information about the distribution of our Macrolepidoptera. He was a more ambitious driver of the motor car than was common at that time; part of his story for 1937 begins: "On July 8th I began my main summer holiday, consisting of, on the whole, a successful tour of the British Isles . . .". So, indeed, it was, beginning near Portsmouth, where *Leucania turca* was found to be the commonest moth on the sugar, continuing via the Dorset coast and heaths, the Cotswolds, North Wales, the Lake District, to Rannoch and Aviemore, whence he returned to Surrey on August 2nd by way of Witherslack and the Norfolk coast and Broads, where larvae of *Papilio machaon* were common. I remember that Dr. E. B. Ford and I, who did not then know Charles personally, after reading these accounts, used to exchange unsuitable remarks about witches' broom-sticks and the like.

After the war Charles continued for some years to do some chemical research; but he gave most of his time to the Lepidoptera, though he was also a keen and knowledgeable ornithologist. I came to know him early in 1947 when I became a near neighbour in north-west Surrey, where he contributed much to the gathering of information about that part of the country, which was then entomologically little known and still less recorded. I also went with him on many expeditions further afield in Britain and, as he became increasingly interested in the Continental fauna, in the Alps, Pyrenees, Corsica, and later in Greece, where he was among the first to find two butterflies, *Agrodiaetus coelestina* Eversmann and *A. damone* Eversmann, which were previously unknown west of U.S.S.R. and Asiatic Turkey. Besides Spain and north European countries, he visited Morocco, East Africa, the Congo, Malaysia, Australia, the West Indies, and Canada, thus getting some field knowledge of exotic species of both butterflies and moths. His last cross-Channel visit was to Guernsey in 1978, and he was planning another when he died.

Charles de Worms was essentially a personal collector; his very large collection contained only insects which he had caught or reared himself, and, apart from some interest in the Pyralidina he made no study of the "micros". He was not an explorer; he concentrated, some of his friends thought, too much on places which he already knew, or had reason to expect, contained a good selection of interesting species or aberrant forms. Nevertheless, he made some important finds: the rediscovery, as British species, of *Colobochyla salicalis* in the Kentish woods in the 'Thirties, and a share, after the first alert, in that of *Eugraphe subrosea* in mid Wales in 1967, and also of *Eilema caniola* in Ireland in 1954; with his friend J. L. Messenger he made the first record of the Pug *Eupithecia phoeniceata* in 1959 in Cornwall; his home light-trap at Horsell gave him one of the second and third British examples of the immigrant *Plusia Chrysodeixis acuta* which were caught on the same night in 1955.

He had a very good eye for species, reinforced by knowledge of the literature and by much study at the British Museum (Natural History). He was thus able, and very ready, to help with identification of the many apparent novelties which were shown to him, though, like most field

lepidopterists, he was more often confused than enlightened by the frequent and ephemeral changes in nomenclature. His literary output on entomological subjects was very large; but with exception of "The Butterflies and Moths of London and its Surroundings" with its biennial supplements (1952-1978), "The Macrolepidoptera of Wiltshire" (1962), and the chapter on the Notodontidae which he contributed to volume 9 of "Moths and Butterflies of Great Britain and Ireland" (1979), it consisted of several hundred articles and short notes, widely spread in periodicals or in the notes of the entomological congresses which he often attended. Many are valuable for reference, and it is hoped to assemble a complete list of them at a later date. His collection he bequeathed to the Royal Scottish Museum, Edinburgh; his fine natural history library to this Society, where it will be much used.

Charles had a remarkably wide circle of friends and acquaintances in many lands. For many years he gave parties for some of them at Christmas, and he kept in touch with more at meetings, by visits when he was on collecting expeditions, by letters and postcards (the decyphering was sometimes difficult), and, above all, by telephone. Several of his friends found that he had talked cheerfully to them by this means only a few hours before his death. He fought hard, not only in his last years, against ill health. He had a strong and usually profitable interest in horse racing. He was a kindly man, good with cats, dogs and small children. In short, a "character", leaving a gap which will not be precisely filled.

R.F.B.

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(continued from Vol. XII, p. 112)

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MIDDLE EAST LEPIDOPTERA, XXXV(1) — NOTES ON RECENT CAPTURES OF MOTHS IN THE LEBANON, SYRIA AND SINAI (with two text-figures)

by E. P. WILTSHIRE

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TORBEN LARSEN kindly gave me some moths taken in September 1973 in the Lebanon; and D. BENYAMINI a smaller lot of moths taken in Sinai, mostly at the monastery of St. Catherine on 25th August 1978.

Some of these were new records for the respective countries, others clinched doubtful points in previous lists. Details are given below, and I have added in some cases comments on their distribution or taxonomy.

This also provides an opportunity to mention some other "new records" (additions to previous lists). Some of these were taken by Professor Abdul Mun'im S. Talhouk in the Lebanon or Syria as long ago as 1935-50, others were caught by myself on my 1962 visit to the Lebanon, and a few others by Dr. Kasy and Mrs. E. Vartian in May 1963.

The lists referred to are Ellison and Wiltshire 1939, with its Addendum 1940; and my Egyptian list (1948-1949) with a short addendum in 1970 (see references).

LEBANON AND SYRIA

In this list of additions I follow the order of families of our 1939 list. As regards the localities, most will be found in that work. However, "Haz-miyeh, Beirut" is described in Larsen's book (1974). Most of Larson's moths come from this locality; it is a lower middle-height garigue habitat on Cretaceous limestone, close to the localities of Afuriyah and Luize in the 1939 list. The other locality of Larson's moths is "Jebel Kesrouan", which is on the eastern side of the main Lebanon range, north of Zahle; it was inaccessible by road when Ellison and I resided in Beirut.

SPHINGIDAE

Acherontia styx Westw.

SYRIA: Abu Shamat, a specimen taken by HAINES on 30.ix.1958 showed that this Asiatic death's head hawk-moth has moved up the Euphrates valley and penetrated Syria. The African species, *A. atropos* (L.) was recorded for the Lebanon in my Addendum (Wiltshire 1940).

Mimas tiliae (L.)

LEBANON: Beirut, 14.v.31, leg Cremona; the specimen is correctly identified but its authenticity as Lebanese is not quite sure.

Berutana syriaca Led.

Previously considered a subspecies of *B. kotschyi* Kollar, Ebert 1976 has shewn it to be *sp. bona*.

ARCTIDAE

Arctia hebe L.

SYRIA: Aleppo. 4.iv. 1944 (A. S. Talhouk).

Phragmatobia placida (Friv.)

LEBANON: Aley, 1.vi.1937 (A. S. Talhouk).

LYMANTRIIDAE

Orgyia trigotephras orientalis Stgr.

LEBANON: Aley, 1.vi.1937 (A. S. Talhouk).

(1) This article appears out of order in this taxonomic series; neighbouring numbers were: (1977) XXXIV; (1977) XXXVI; and (1977) XXXVII. For titles and journals, see References at end.

Orgyia dubia turcica Led.

LEBANON: previously only recorded from the Bsherre range, now recorded from 1,600 m. Jebel Kesrouan. 3 ♂, 21.ix. 73 (T. Larsen).

THAUMETOPOEIDAE

Thaumetopoea libanotica Kir. & Tal. 1975.

The form considered, and figured in Pl. 1, fig. 24 of our 1939 list, as a dark high mountain form of *T. wilkinsoni* Tams, has now been diagnosed as specifically distinct with the above name.

LASIOCAMPIDAE

Malacosoma neustria (L.)

SYRIA: Aleppo (A. S. Talhouk). The markings of this example resembled those of *M. parallela* Staudinger but according to Daniel 1964 this name cannot be used for the Asia Minor race which he considered typical *neustria*. Talhouk later reported doubtless the same *Malacosoma* form from LEBANON: Bekaa, etc., but these I did not see. Relevant material is hard to come by, so the question the right sub-specific name must be left open.

Malacosoma castrensis kirghisica Staudinger

LEBANON: Bsherre Cedars, 2 exs., 21.vi.62 (E.P.W.).

Dendrolimus bufo Led. (♂ genit. fig. 1)

LEBANON: Hazmiye, 4 ♂, 1 ♀ (T. Larsen. The fact that this moth was not noticed in the Lebanon either by Ellison or myself may indicate that the past thirty years have witnessed a deterioration of the Middle Height garigue and an invasion by more eremic flora and fauna. The moth, described originally from "Syria" has recently only been taken, to my knowledge, in the Jordan Valley (T. Trought) and in Jebels Akhdar & Aswad, Oman (K. Guichard). The larva in the Jordan is rather similar to those of the closely allied species *D. alferii* A. & Seitz which inhabits, or used to occur in, the Eastern desert, Egypt. A comparison of the genitalia of *alferii* (fig. 2) with those of *bufo* shews affinity but hardly conspecificity. Wiltshire 1948 Plate 1 illustrated in colour a larval skin of *alferii* and both sexes of the adult, which is paler and smaller than *bufo* but similarly marked.

LEMONIIDAE

Lemonia peilei talhouki Wiltshire 1952

SYRIA: This race was based on a ♂ from Deir-ez-Zor on the Euphrates; the ♀ forewing of the same desert race (not mentioned in my description) is like that of the typical race from eastern Iraq, concolorous pale brown, instead of bleached from base of forewing to post-median line as in the ♂.

Lemonia beirutica Daniel 1965

LEBANON. The damaged ♂ figured in my 1939 Plate as "*L. ? ballioni* Chr.", and later described with the above name, was also recognised as *sp. bona* in Rougeot 1971: 36.

Lemonia sacrosancta Püng.

SYRIA: Homs, 1.i.51 (A. S. Talhouk).

LIMACODIDAE

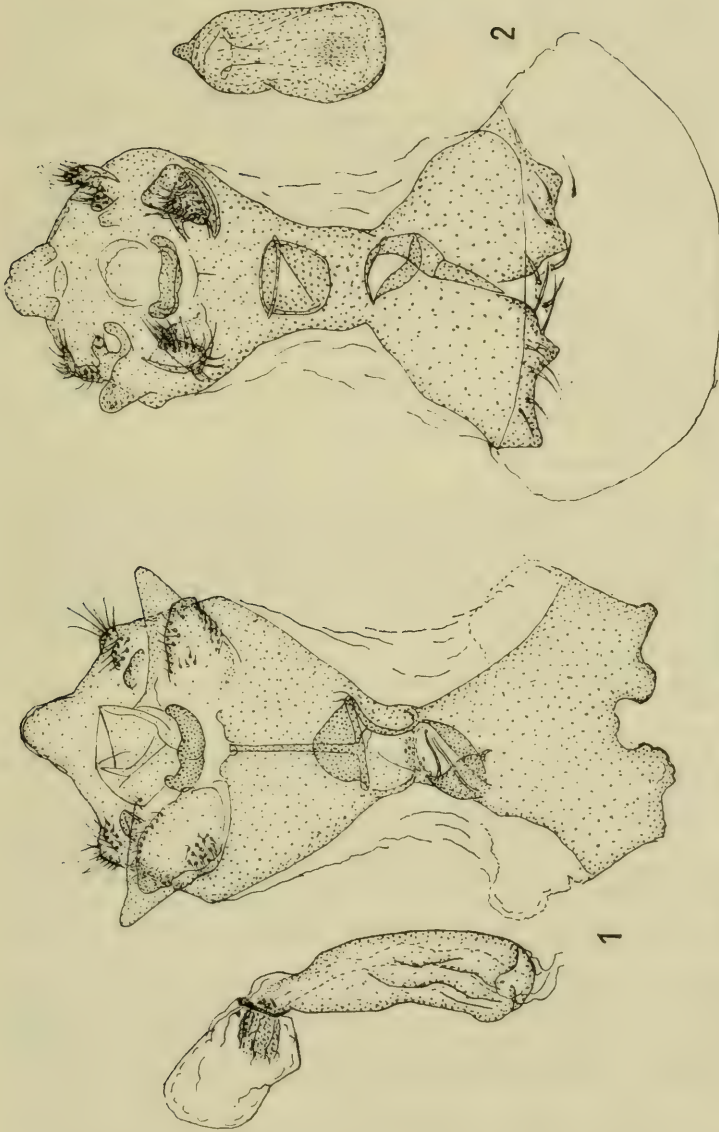
Parasa inexpectata Staudinger

LEBANON: Hazmiyeh, 1 ♂, ix.73 (T. Larsen).

NOCTUIDAE

Ochropleura melanura (Koll.)

SYRIA: Anti-Lebanon. The varieties ab. *roseotincta* Corti and ab. *albida* Caradja were taken flying together near Damascus by A. S. Talhouk.



Figs. 1, 2. Male genitalia of *Dendrolimus* spp.:— 1. *D. butfo* Led. (Oman); 2. *D. alferii* And. & Seitz. (syntype, EGYPT).

Standfussiana lucernea (L.)

LEBANON: Bsherre Cedars, 22.vi.62 (E.P.W.) flying together with *S. defessa* (Ld.) *bona* sp.!

Mythimna straminea (Tr.)

LEBANON: Bekaa: Amik marsh, 1 ♂ (Prep. 606), 10.vi.34 and 1 ♀, 1.vii.34 (both E.P.W.). The first record for this species from Lebanon and the Middle East.

Mythimna languida (Walker) (= *consanguis* auctorum, nec Guenee)

LEBANON: Bekaa: 1 ♂ (Prep. 1950), 28.v.34. A species often called "*Polia consanguis*" by old authors (and so called in Wiltshire 1940: 81). This belongs to a group recently proved to consist of a number of distinct species differing genitally; *M. languida* (Walker) is widespread in Africa and is also found as far East as Arabia. It must not be confused with *Mythimna* (subg. *Leucania*) *languida* Staudinger — which occurs in Iraq, Egypt, etc., and is probably of Saharan-Arabian range. As the groups to which the two species belong will probably be generically separated in a forthcoming revision, it seems unnecessary to seek another name for *languida* Staudinger.

Hadena pfeifferi (Draudt)

LEBANON: Bsherre Cedars, 2 exs., 6,300 ft., 22.vi.62 (E.P.W.).

Polymixis subvenusta (Püng.)

SYRIA: Azra, 31.xi.50 (A. S. Talhouk).

Conistra kasyi Boursin 1963

This is the correct name for the species recorded as *C. vau-punctatum* Esp. in our 1939 list. Boursin's description of *kasyi* (Bull. Soc. Linn. Lyon 32: 299) was based on two examples taken (in the Lebanon) in May after hibernation, where as the series taken by me at the Cedars in October were much clearer and brighter. Boursin only saw them after describing the new species and confirmed that they were *kasyi*; this is another apparently endemic Lebanese species!

Caradrina belucha Swin.

SYRIA: Damascus, 12.x.50 (A. S. Talhouk). This appears to be the westernmost record of this Eastern Eremic species.

Chrysodeixis chalcites (Esp.) group

It is hoped to deal with this group's Middle East representatives in a separate article in this series shortly.

Iranada turcorum (Zerny)

LEBANON: coastal dunes, near Beirut, 1 ♀, v.1963 (Kasy & Vartian). The types of Zerny were from Haifa, and Kasy and Vartian also took the species in Iraq, near Rutba. More recently an example was taken 9.iv.77 in SAUDI ARABIA, Riyadh, by A. S. Talhouk and, of course the darker eastern form has also been taken recently in Oman (see Middle East Lep. XXXVI for the new genus).

Autophila osthelderi libanopsis Boursin

LEBANON: Bsherre Cedars, 1 ♂ (Prep. 1213) 22.vi.62 (E.P.W.). This form flies together with the larger, and weaker-marked, but similarly coloured *A. libanotica* Staudinger, already listed, of which I took 1 ♂ (Prep. 1214) at 2,000 m near the Cedars in vi.62.

GEOMETRIDAE

Idaea saida (Wiltshire 1968)

This new name was substituted for "*Sterrhia holliata* sensu Wiltshire 1939, nec *holliata* Homb.". Fresh specimens were taken near Sidon in v.63

by Kasy and Vartian, the other types of the species being the Shweir (Middle Height) examples previously listed as *holliata*.
Idaea palaestinensis (Stern.)

This moth was not mentioned in our 1939 list, as it was not described when this was written. It is in fact fairly common and I myself took a series in 1933 at Shweir (Middle Heights) and also at Beirut (coast), the former in July, the latter in June.

Opisthograptis luteolata (L.)

LEBANON: Bsherre Cedars, c. 6,000 ft., 18.vi.62 (E.P.W.).

PYRALIDAE

SYRIA: Anti-Lebanon: the two small dark *Pyrausta* taken by me at Neba Barada, 24.vi.34, were not, as det. by H. G. Amsel and listed by me in 1939, *P. nubialis* Hübn., but *Ostrinia appositalis* Led. **bona species (comb. nov.)**.

EGYPT: SINAI

The two following additions to my 1948-49 annotated and illustrated list are from St. Katerina, 1,600 m, the same locality as that visited by Alfieri and Eflatoun in April 1940, as detail in my 1948-49 list.

GEOMETRIDAE

Scopula nepheloperas Prout

One ♂, the most northerly record for this Eremic moth, distributed from the Horn of Africa to Oman.

Gnophos dubitarius Staudinger

One ♂ (Prep. 2017). This confirms the tentative determination made in my list Part 2 (1949), when only females were available. The moth is an "Anatolian-Iranian" element, being known from several parts of the Zagros range (west and south-west Iran), but I recently also received a male specimen from An Nimas, in the Asir mountains of Saudi Arabia, south of the tropic (leg. A. S. Talhouk). It is one of those Palearctic butterflies and moths that have penetrated the north of the Tropical Zone along the mountain-chain of Western Arabia, and most of such species are now disjunct in their tropical habitats and confined to high altitudes.

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THE LARGEST PIPUNCULID IN THE LAND:

Nephrocerus scutellata (Macquart, 1834) (Diptera, Pipunculidae)
**NEW TO BRITAIN, WITH OBSERVATIONS ON ITS BEHAVIOUR
 IN GREECE**
 (with one figure)

by ALAN E. STUBBS

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The Diptera Recording Schemes held a week long field meeting in June 1979 based at Rogate, Sussex. The weather had been rather poor throughout (despite which 91 hoverfly species were recorded) but on the last day, 15th June, the sun broke through between 'April' showers. Under such conditions a visit was made to King's Park Wood, West Sussex, a Forestry Commission area displaying 'conservation area' notices. The wood contains remnants of tall oak forest but much has been cleared to produce a mixed deciduous scrub with conifers breaking through. After two hours along the main ride, a small party was about to leave in early afternoon when a *Nephrocerus* was swept from grassy herbage which was partially overhung by the branches of shrubs.

The specimen, a male, was huge for a pipunculid — 26 mm wing span. Those familiar with *N. flavicornis* Zett. of the British list quickly realised that it was far too large for that 'giant' and noted that the scutellum was yellow. After hearing a brief account of the behaviour of such pipunculids in Greece, Dr. A. Irwin and Mr. P. J. Chandler spent half an hour trying to locate further specimens with success.

The Handbook by Coe (1966) gives a key to the three known European species of *Nephrocerus*. The specimen readily runs to *N. scutellata*, the yellow scutellum being distinctive. The size range is given as wing length 8-9.5 mm. The other source of reference is Sack (1935) on which Coe's key was presumably based.

The British specimen is much larger than given in the above references with a wing length of 11.5 mm. Examination of two female specimens (from South France and Switzerland) standing under the name *N. scutellata* in the British Museum reveals that this sex has broad rounded wings, as found in both sexes of *N. flavicornis*. The puzzling thing is that the British male *N. scutellata* has long narrow wings yet neither Sack nor Coe make



Nephrocerus scutellata Mg., the male taken in Sussex, 1979.

reference to sexual dimorphism in wing shape. The British specimen would appear to be conspecific with five males recently brought back from Greece, whose size range varies from that of the British specimen down to the size given by Coe. It has been decided to refer the British specimen to *N. scutellata* but the accompanying illustration serves to alert anyone who should come across broad winged males.

It was by extraordinary coincidence that the behaviour of *N. scutellata* males had been observed in Greece only a few weeks previously. At mid-day on 4th May a visit was made to a steep north facing ravine with mixed deciduous and non-deciduous *Quercus* at 450 metres in the mountains 18 km north-east (by north) of Nafpaktos. In the shade beneath a deciduous oak there were large flies darting back and forth in the 2 metre gap between the barren ground and the branches. Five were taken, leaving others starting to dart around again after the disturbance. In the net they had the appearance of the stratiomyid *Sargus* in having long body and wings.

The known biology of the Pipunculidae indicates that the family is exclusively parasitic on leaf hoppers, Homoptera Auchenorrhyncha. The hosts of *Nephrocerus* are unknown but Coe summarises the earlier speculation that the cicada, *Cicadetta montana* (Scop.), may be the host of the then largest known British pipunculid, *N. flavicornis*. That notion has been discounted because the cicada is currently only known from one area in the New Forest whereas *N. flavicornis* is far more widespread. A large bug associated with oak trees, *Ledra aurita* (L.), is a more plausible suggestion mentioned by Coe. This leads to the inevitable question as to what a much larger *Nephrocerus* such as *N. scutellata* could find as a host. Is this where *Ledra* becomes the most likely candidate or does the woodland of West Sussex support an as yet undiscovered giant leaf hopper?

The Forestry Commission kindly gave permission for the Diptera Recording Schemes to send a party to their conservation area. The specimen from Sussex and those from Greece have been placed in the British Museum (Natural History). Thanks are passed to Stephen Falk for illustrating the British specimen.

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FIELD MEETINGS

SWANAGE — 23rd September 1978

Leader — Mr. P. J. BAKER

Only one other Member joined the leader, to be met with the usual anticyclonic weather so regularly experienced at this venue in the autumn. However, towards dusk, a force five S.W. wind brought in a little cloud and held the temperature into the mid fifties. We therefore enjoyed quite reasonable results at the lights which were set up in a sheltered spot.

A third Member arrived about 8 p.m. and as he couldn't find the main "party" he set up his lights in the valley, where he noted several insects not seen elsewhere that night.

When we first arrived large numbers of *Aglais urticae* (L.) and a few *Parage aegeria* (L.) were seen flying in the sunshine in the more sheltered areas. The warden told me that in fact the small tortoiseshell had had a phenomenal year in the area. He also reported that a specimen of *Strymonidia w-album* (Knoch) had been seen near the lighthouse in August. This is an interesting record following the discovery of a pupa of this insect at the BENHS meeting earlier in the year.

A quick search just before dusk showed that the ivy blossom was not yet out around the hotel, but in this area many of the willows had been defoliated and three large nests of *Phalera bucephala* (L.) were located. Around dusk, whilst looking for a sheltered spot to run the lights, several *Orgyia antiqua* (L.) were seen in flight, along with *Mythimna l-album* (L.). After dark my companion set off in an unsuccessful search for *Leucochlaena oditis* (Hün.) among the short grasses around the hotel. However, on his way back to the lights his efforts were rewarded by the sight of a slow worm on the cliff edge path.

The light trap records were as to be expected for the time of the year plus one or two stragglers which were around rather later in the season than is usual. However, two insects worthy of note were recorded.

In September 1976 several small specimens of *Campaea margaritata* (L.) were noted and it was assumed that these were second brood specimens which had occurred due to the very hot season. Well, several, slightly larger but still much smaller than typical, specimens of this moth were seen on this visit. As the 1978 season had been, if anything, unfavourable, it is possible that a second brood of this insect may be normal in the area.

Single specimen of *Scotopteryx bipunctaria* (Prout) was noted. This was perfectly fresh, but small, having a wingspan of only 24 mm. I have never heard that this moth has migratory tendencies and it is presumably the result of a second brood. To my knowledge a second brood for this insect has not been previously recorded.

Whilst setting up the light trap a specimen of *Polyommatus icarus* (Rott.) was noted sitting on a grass stem some four feet away. When the trap was checked later, the grass stem had been vacated and the common blue was found among the egg boxes. I have had several previous experiences of members of the *Hesperiidae* and *Nymphalidae* being attracted to a light set up in their vicinity but this is my first experience of this behaviour in a blue.

Other records at the lights near the hotel were: — *M. l-album* (L.), *Xanthorhoe fluctuata* (L.), *Xestia xanthographa* (D. & S.), *Chloroclysta truncata* (Hufn.), *Pleuroptya ruralis* (Scop.), *Hypsopygia costalis* (Fabr.), *Noctua pronuba* (L.), *Udea ferrugalis* (Hubn.), *Ennomos fuscantaria* (Haw.), *Xestia c-nigrum* (L.), *Noctua comes* (Hubn.), *Agrotis segtum* (D. & S.), *Amphipyra berbera* (Fletcher), *Autographa gamma* (L.), *Opisthograptis luteolata* (L.), *Mythimna pallens* (L.), *Cosmia trapezina* (L.), *Mesapamea secalis* (L.), *Aplocera efformata* (Guen.), *Phlogophora meticulosa* (L.), *Aporophyla australis* (Bois.), *Hoplodrina ambigua* (D. & S.), *Xanthia icteritia* (Hufn.), *Calophasia lunula* (Hufn.), *Epione repandaria* (Hufn.), *Agrotis ipsilon* (Hufn.), *Eumichtis lichenea* (Hubn.), *Omphaloscelis lunosa* (Haw.), *Mesoligia furuncula* (D. & S.), *Amphipyra tragopoginis* (Clerck), *Agrotis puta* (Hubn.), *Thera obeliscata* (Hubn.), *Caradrina clavipalpis* (Scop.), *Luperina testacea* (D. & S.), *Gortyna flavago* (D. & S.), *Ennomos alniaria* (L.), *Xanthia togata* (Esp.), *Mythimna impura* (Hubn.).

The light in the valley produced fewer insects due to its more exposed location. Those not recorded elsewhere were: — *Agriphila geniculea* (Haw.), *Tholera cespitis* (D. & S.), *L. oditis* (Hubn.).

Note. The leader paid a further visit to Swanage on 6th October. It was a poor night and only fourteen moths were seen. Thirteen of these were recorded on the BENHS meeting of 23rd September but the other was *Mythimna albipuncta* (D. & S.).

SANDY DOWN, BOLDRE, HANTS. — 24th/25th March 1979

Leaders — Mr. and Mrs. R. W. WATSON

Once again members were enabled to visit and admire the leaders' collection, and enjoy their hospitality.

RANMORE, SURREY — 26th/27th May 1979

Leader — M. V. GREY

The meeting was literally a wash-out: — two members turned up but after a walk around the area it was decided not to go ahead with the night operations, as then, rain had started; it continued for the rest of the afternoon and night.

BOTLEY WOOD, HANTS. — 2nd/3rd June 1979

Leader — J. R. LANGMAID

Some sixteen members and friends attended all or part of this day/night meeting. The weather started unpromisingly with mist and rain, but it soon cleared and an enjoyable day was spent in this rich locality. During the day larvae of *Agonopterix bipunctosa* (Curtis) were found on *Serratula tinctoria*; and cases of many species of *Coleophora* were also found, including *C. conyzae* Zell., *C. palliatella* (Zinck.), *C. vibicella* (Hübner.), *C. inulae* Wocke, *C. troglodytella* (Dup.) and *C. peribenanderi* (Toll.). Imagines of note taken during the day included *Glyphipterix forsterella* (Fab.), *Ancylis obtusana* (Haw.), *A. apicella* (D. & S.), *Hysterophora maculosana* (Haw.), and one specimen of *Rheumaptera hastata* (L.), which seems to be on the increase in Hampshire after many years of decline. Those staying on for the night-meeting adjourned to a local hostelry for an evening meal, and later some half-dozen MV lamps were set up in the woods. The night was mild, but the spectrum of attendant lepidoptera somewhat disappointing. The only species of interest seen were *Semioscopis steinkellneriana* (D. & S.), *Eucosmomorpha albersana* (Hübner.), *Semiothisa alternaria* (Hübner.), *Cepphis advenaria* Hubner., *Ectropis crepuscularia* (D. & S.), *Cyclophora annulata* (Schulz.), *Clostera curtula* (L.), *Tethea or* (D. & S.), and *Acrionicta alni* (L.).

The total number of species recorded was one hundred and eighty-six, which was not unsatisfactory considering what a poor early season we had this year.

Our thanks are due to the Forestry Commission for permission to hold the meeting in Botley Wood, and for the unfailing courtesy and helpfulness of the Foresters in helping to conserve the insects in the area.

SWANAGE — 9th/10th June 1979

Leader — B. SKINNER

As the leader received no prior notification from potential visitors it was decided to cancel this meeting. This lack of response was almost certainly due to the combined effects of the unfavourable weather conditions of this period and the acute shortage of motor fuel.

THE WILDERNESS, NEAR KINTBURY, BERKS. — 7th July 1979

Leader — B. R. BAKER

Warm sunny weather prevailed for this excursion which was attended by seven members. The afternoon was spent exploring the reed bed area between the river Kennet, with its several feeder streams, and the main

Western Region railway line. *Callimorpha dominula* (L.) was soon in evidence either in colourful flight across the droves or at rest on comfrey leaves, and several *Eurrhynx lancealis* (D. & S.) were disturbed from the thick growths of hemp agrimony. The saw-flies *Arge pagana stephensi* (Leach), *Tenthredo mesomelas* (L.) and *Dolerus niger* (L.) were seen on hogweed flowers, and *Tenthredopsis litterata* (Geoffrey) was beaten from hawthorn. Larval saw-flies included *Cladius pallipes* (Lepeletier) from hawthorn and *Pontania viminalis* (L.) galling the leaves of *Salix purpurea*. After a break for tea the party explored the woodland beyond the reed areas; these consisted of poplar plantations and mixed growth of willow, alder, the occasional conifer and even mature oak and beech. Beating the alders along the edge of marshy field produced several specimens of *Stathmopoda pedella* (L.) whilst the field, which had good patches of marsh orchids and ragged robin, produced the occasional specimen of *Eustrotia uncula* (Cl.). The conditions at night were not ideal for nocturnal lepidoptera, but two generators operated lamps in the reed bed area and a Heath trap was placed on a ride near the woodland edge. From these a total of 66 macro-lepidoptera were recorded which included the following species: — *Xanthorhoe quadrifasciata* (Cl.), *Perizoma flavofasciata* (Thunb.), *Leucoma salicis* (L.), *Anaplectoides prasina* (D. & S.), and *Mythimna obsoleta* (Hb.). One member, who preferred exploration with a tilley lamp before being attracted back to the mercury vapour operators, was rewarded by finding *Rheumaptera undulata* (L.) and plenty of larvae of *Mythimna straminea* (Treit.).

SWANAGE, DORSET — 21st/22nd July and 6th/7th October

Leader — P. BAKER

Due to inclement weather both these meetings were cancelled.

NEW FOREST, HANTS. — 11th August 1979

Leaders — D. H., M. J., and P. H. STERLING

The meeting was attended by 15 members and guests. During the morning, collecting took place over Denny Bog, in the area east of the railway line, from Beaulieu Road Station to a point about a mile south of this. A specimen of *Scopula emutaria* (Hubn.) was taken near the station. A marshy area where a stream passed under the railway gave some interesting collecting. Stems of *Typha latifolia* produced pupae of both *Nonagria typhae* (Thunb.) and *Archana sparganii* (Esp.) and imagines found included *Orthotaelia sparganella* (Thunb.), *Limnaecia phragmitella* (Stt.) and *Schoenobius forficella* (Thunb.).

During the afternoon the party followed the railway northwards from Beaulieu Road Station to Matley Bog. En route, in a drier area, many larvae of the large Psychids, *Pachythelia villosella* (Ochs.) were found on heather. Collecting continued along the line of Matley Bog away from the railway towards the road. This produced a number of species including *Batrachedra praeangusta* (Haw.), *Ancylis apicella* (D. & S.), *Crambus silvella* (Hubn.), and the interesting Plumemoth, *Buckleria paludum* (Zell.) which was found in some numbers flying over its foodplant *Drosera* (insectivorous sundew) in the late afternoon sun.

Unfortunately the sky remained clear and the temperature dropped quickly, spoiling what had earlier promised to be a good collecting night. The venue for night collecting was Denny Wood, and MV lights, actinic

lights and sugar were used, but produced little of note. Species taken included three *Catocala promissa* (D. & S.), one *Eustrotia uncula* (Clerck), one *Eupithecia pimpinellata* (Hübner), some *Agriphila selasella* (Hübner) and *Catoptria pinella* (Linn.).

In all, some 87 species of Lepidoptera were recorded.

Birds noted included *Pernis apivorus* (honey buzzard) and *Oenanthe oenanthe* (wheatear).

DUNGENESS, KENT — 29th/30th September 1979

Leader — P. A. SOKOLOFF

Twelve members attended all or part of this meeting, and were pleased to welcome representatives of the Kent Field Club and the Wealden Entomology Group. The warden of the Dungeness RSPB reserve and two of his colleagues asked if they could observe light trapping techniques, and were welcomed to the leader's sheet where they spent most of the evening. Despite the late date of the meeting, the weather was warm and sunny during the day, although the usual Dungeness "breeze" persisted throughout the day and evening.

Few species were on the wing during the day, a single *Coenonympha pamphilus* L. was seen, and the third brood of *Lycaena phlaeas* L. was well in evidence. A fine ab. *schmidtii* Gerh. of the latter species was netted by the only non-lepidopterist in the group, Dr. Dicker, who generously presented the specimen to the Leader. Several specimens of *Teleiopsis diffinis* (Haw.) were netted flying over sorrel, presumably representing a partial second brood of this species. The afternoon was spent searching for larvae, and the recent captures at Dungeness of the Scarce Chocolate Tip, *Clostera anachoreta* (D. & S.), increased the general sense of anticipation in the group. Defoliated branches were examined closely, but usually turned out to be the work of *Phalera bucephala* L. However, careful searching of the willow bushes by Mr. J. Platt and Mr. P. Jewess yielded a total of seven *anachoreta* larvae. Lesser fry included a few fully grown *Calophasia lunula* Hufn., as well as the normal range of autumnal larvae. Webs of the Brown-tail moth, *Euproctis chrysorrhoea* (L.) were depressingly common on willow, rose, bramble and sloe. We were too late for the larvae of *Acleris hastiana* L., although a few pupae were located.

A clear, sunny day turned into a clear, if hazy, evening. The temperature, however, was not as low as recently experienced, and fortified by refreshment obtained at the 'Britannia', members set up five lights in the willows and sugared several posts. Some 29 species of lepidoptera were recorded, including *Aporophylla australis* (Boisd.), *Eumichtis lichenea* (Hübner), *Gortyna flavago* (D. & S.), *Paradiarsia glareosa* (Esp.), *Acleris emargana* (Fab.), and *Epinotia caprana* (Fab.). Numbers of *Autographa gamma* (L.) were low, but included the *gammata* (Staud.) form. No other migrant species were noted, but the RSPB warden commented that *gamma* had become numerous for a few days during mid-September.

Few species of "other orders" were noted, although the lesser cockroach, *Ectobius panzeri* Steph. was common on the willows, and a specimen of the littoral grey bush cricket, *Platycleis albopunctata falcata* Zett. (= *P. denticulata* Panz.) was noted at the Britannia Inn.

BROXBOURNE WOODS, HERTS. — 13th/14th October 1979

Leader — R. DYKE

On a sunny afternoon, seven members attended this meeting.

The afternoon was mostly spent in blackthorn thickets looking for *Acleris cristana* (D. & S.) which were very thin on the ground, the best catch being a *Nycteola revayana* (Scop.) form *ramosana* (Hübner) which fell to the President's net. *Chesias legatella* (D. & S.) was our next objective and this moth flew readily when disturbed from broom.

Lights were lit for night collecting and a search was made at dusk for *Schranksia intermedialis* Reid 1972 without success. The clear sky produced a very cold night, and when a thick mist began to descend, operations ceased.

The following lepidoptera were recorded: — *Diloba caeruleocephala* (Linn.), *Agrochola helvola* (Linn.), *A. lota* (Clerck), *A. macilenta* (Hubner), *Eupsilia transversa* (Hufn.), *Conistra vaccinii* (Linn.), *Nycteola revayana* (Scop.), *Epirrita dilutata* (D. & S.), *E. chrysi* (Allen.), *Erannis defoliaria* (Clerck.), *Acleris emargana* (Fabricius), *Epinotia solandriana* (Linn.), *Acleris rhombana* (D. & S.).

PROCEEDINGS

12th July 1979

The President, the Rev. D. J. L. AGASSIZ, in the chair.

EXHIBITS

Dr. A. A. ALLEN — A male example of *Barylypa insidiator* Foerster (Hym., Ictneumonidae) bred 8.v. 1979 from *Anarta myrtilli* (L.) (Lep., Noctuidae). The host larva, with others, was swept from heather on Hankley Common, Surrey, 31.viii.1978, pupating the following month. The record is of interest on two counts: firstly, the three British species of *Barylypa* are all very rare (see Gould 1978) and the present host represents only the second species of host recorded for *B. insidiator*. Secondly, the larvae were collected in a deliberate attempt to rear the parasite; the exhibitor had caught 2 ♀ adults earlier in the day and immediately proceeded to collect all possible larvae in the area of Hankley Common in efforts to rear the parasite, which has also been recorded from *Panolis flammea* (D. & S.) (Noctuidae) (Gould 1978) and in view of the pine/heather foodplants of the host larvae, Dr. Gould's suggestion that *Barylypa* may prefer sandy areas would appear to be substantiated.

K. SAMUELS — Eleven young larvae of *Sphinx ligustri* L., privet hawk-moth, and an unknown larva on lilac.

E. P. WILTSHIRE — Three males of *Photedes morrisii* (Dale) (Bond's wainscot (Lep., Noctuidae) with the foodplant, all from a West Dorset cliff habitat. Most examples in public collections have proved to be of the Folkestone, Kent, race of this moth; the original locality of the species was visited to obtain the topotypical race and compare it with the Kent race. On the whole, the Dorset race seems more marked on the forewing, though in a long series from Folkestone a few examples resemble the Dorset form, and probably vice versa. The exhibitor took seven examples all flying at dusk (10.00-10.30 p.m. B.S.T.) in late June 1979.

MEMBERSHIP

Mrs. A. E. Finch and Messrs. T. M. Strange, I. J. Picado and J. M. Moonan were declared elected, their names having been read a second time. K. Samuels signed the obligation book.

COMMUNICATIONS

R. FAIRCLOUGH said that in Cumbria he had recently seen *Erebia epiphron* (Knoch (Lep. Satyridae) in some numbers and had also seen a single *Vanessa cardui* (L.) going over the mountain.

C. G. DE WORMS reported that at last a spell of sunshine had favoured the Rhopalocera but he had found, on visiting a site at Chiddingfold, a Forestry Commission notice stating it was a "conservation area". He observed *Ladoga camilla* (L.), white admiral, and *Argynnis paphia* (L.), silver-washed fritillary, flying there (Lep., Nymphalidae), and some ten other species of Rhopalocera. He and other members had also recently attended the memorial service for Dr. H. B. D. Kettlewell on June 30th, at Oxford, the Rev. Anthony Harbottle officiating.

E. H. WILD stated that Mr. Walker had noted *Macroglossum stellatarum* (L.) recently in the Dunsfold area, and several members reported that they had been taking an unusual proportion of small examples of moths, including melanic peppered moths (*Biston betularia* (L.) ab. *carbonaria* and *Amorpha populi* (L.) (poplar hawk-moths). A discussion of phenological anomalies also ensued.

M. W. F. TWEEDIE and Dr. A. A. ALLEN then exhibited each a series of good slides of Lepidoptera, the former mainly British micro-lepidoptera adults, the latter with some emphasis on early stages. In the discussion several members remarked on the parallel in the stance of the *Ypsolopha* adults with the stance of hairstreak butterflies and the probability that markings, wing-folding and stance in both groups served to divert the attacks of predators from the head to the less vulnerable tail parts of the wings.

26th July 1979

The Vice-President, R. FAIRCLOUGH, in the chair.

The Vice-President announced with great regret the death of E. F. Williams, on 20th July. He joined the society in 1945 and later purchased Skipper's Island, the headquarters in England of *Gortyna borelii* Pierret *lunata* Freyer (Lep., Noctuidae), and presented it to the Essex Naturalists' Trust.

EXHIBITS

Dr. A. A. ALLEN — (a) An example of *Ophion maccaryi* Kreich., (Hym., Ichneumonidae) caught by day on 1.vi.79 at Brownsea I., Dorset. The species is quite common in May but most often obtained at night to light, in common with other members of the genus; (b) A specimen of *Aleucis distinctata* (H.-S.) (Lep., Geometridae), the sloe carpet, captured at actinic light, 12.v.79, at Reigate, Surrey; (c) A ♀ of *Dyscia fagaria* (Thunb.) (Geometridae), bred in mid-June, from a larva collected 18.iv.79 from Haldon Moors, Devon. Four such larvae were swept, all in the same area of a large expanse of moorland. The exhibitor had found the larvae, three of this moth, exactly in the same tiny area once in spring 1978.

J. BROWN — Two Greek blue butterflies, of the genera, *Lysandra* and *Agrodiaetus*, whose determination depended on chromosome numbers.

Col. A. M. EMMET — A specimen of *Gelechia nigra* (Haworth) reared on 29.vi.79 from a spinning on *Populus canescens* collected at Hatfield Heath, Essex on 1st June 1979. The species, said the exhibitor, does not key out correctly in Meyrick's Handbook; though the vase of the abdomen is yellow, he includes it in the section lacking this character.

A. J. HALSTEAD — Aspen shoots (*Populus tremula* L.) galled by an eriophyid mite, *Phytoptus dispar* Nal., collected on Wisley Common, Surrey, 26.vii.79.

S. N. A. JACOBS — Fifteen winged specimens of *Lasius niger* (L.), the black ant, which he had found in two globules of fat, each about the size of a one penny piece, on top of stock from lamb-bone left simmering for one hour on his gas-cooker. A colony of this species had existed for nearly fifteen years in an inaccessible spot in his larder. This year they must have swarmed in July, though no other specimens than those found in the fat could be found despite search.

E. P. WILTSHIRE — (To illustrate his talk) two moths of the genus *Mythimna*, one with normal Noctuid markings and the other a typical "Wainscot" in habitus; also both sexes of the Dorset race of *Hepialus humuli* (L.), the ghost swift, the female with both wings white on the upper surface, blackish on the undersides and abdomen.

COMMUNICATIONS

Dr. C. G. M. DE WORMS stated that the season was now at its zenith, and that *Apatura iris* (L.), the purple emperor, had been seen in spate at Chiddingfold, and in smaller numbers at Alice Holt, Whitley and Ranmore Common. The browntail moth, *Euproctis chrysorrhoea* (L.) had come to light in the Woking area and had also been seen near Wimbledon by Sir John Dacie; the waved black moth, *Parascotia fuliginaria* (L.), had turned up at Bourne, a new locality for it; and gen. 2 of *Selenia tetralunaria* (Hufn.), the lunar thorn, was already out, despite the late start of the season.

S. N. A. JACOBS reported that several dead male wasps had been found in his bath which was early for this sex.

T. HOMER reported that on 10.vii.79 he had taken *Hadena compta* (D. & S.) in his light trap near Maidenhead, and that it had already reached the Reading area in the Thames valley, as reported to him by B. R. Baker.

A member reported that larvae of *Orgyia antiqua* (L.) had stripped a laurel bush (*Prunus lauro-cerasus*) of its foliage, which he considered remarkable owing to this shrub's poisonous properties; E. P. WILTSHIRE said that in his garden in E. Berkshire he had found the larva of *Diloba caeruleocephala* (L.) feeding as happily on this shrub as on a neighbouring plum-tree, and Dr. ALLEN stated that the poison it contained was hydrogen cyanide, which some insects were better able to resist than others. It was mentioned that L. J. D. Wakely had found and bred through to adult stage larvae of *Laothoe populi* (L.) the poplar hawk on laurel foliage, and that burnet moths (genus *Zygaena*) resisted cyanide because they actually contained it.

E. P. WILTSHIRE then gave a talk on "Some Life-forms in the Lepidoptera" illustrated by some seventy slides. He first explained the term "life-form" which did not coincide with taxonomic categories but was linked with habitat and behaviour. B. P. Uvarov had used it in his studies of grass-hoppers. In the Lepidoptera, both colour and structural life-forms could be distinguished; larval forms might agree or disagree with adult forms, dependent often on their resting places by day or their flight behaviour. Illustrations included examples of both of these tendencies and in various coloration-categories, such as conifer-foliage forms, straw-like forms, white forms, warning-coloration, desert-colouring, flash-colouring, etc. In the structural group of forms, an exceptional but obvious one was the tendency to apterism, exemplified by brachypterous or wingless females occurring in many families and apparently caused by different environmental causes; but frontal and fore-leg modifications were also of interest, though less obvious to a superficial glance, extreme cases being associated with an eremic habitat.

A discussion, mainly on brachypterism, followed, showing that this was the aspect of the subject which had particularly interested the audience.

13th September 1979

The President, Rev. D. J. L. AGASSIZ, in the chair.

EXHIBITS

The Rev. D. J. L. AGASSIZ — *Parapoynx stagnalis* (Zell.) and *P. fluctuosalis* (Zell.) (Lep., Pyralidae), two further introduced species of Nymphulinae new to Britain, from aquatic nurseries at Enfield.

Dr. A. A. ALLEN — (a) A male *Zele flagitator* Curtis (= *geminator* (Lyle)) (Hym., Braconidae) swept from herbage in Burgh Wood, Etching-Ham, Sussex, a scarce species; (b) A specimen of *Mythimna putrescens* (Hübner) taken at actinic light 8.viii.79, Dawlish, Devon; and (c) Some mines of an unidentified moth on the under-side of *Hypericum perforatum*.

E. S. BRADFORD — Five species of Coleoptera.

R. FAIRCLOUGH — (a) Old larval feeding webs, cocoons and an adult, the first to hatch, of *Eutromula pariana* (Clerck) (Lep., Glyphipterigidae), the larvae having been found on crab-apple, 3.ix.79 at Epsom, Surrey; (b) Two twigs of purple willow (*Salix purpurea*) showing the larval mines in the bark, then in the leaves, underneath, of *Phyllocnistis saligna* (Zell.) (Lep., Phyllocnistidae), found in the Kennet valley, Berkshire, 12.ix.79; and (c) Larvae of *Calophasia lunula* (Hufn.) found at Dungeness, Kent on 10.ix.79.

C. HART — Four larvae of *Bomolocha crassalis* (F.) (beautiful snout moth) swept from bilberry near Dorking, 11.ix.79.

S. N. A. JACOBS — (a) A specimen of *Scutigera coleoptrata* (L.), the long-legged centipede, found indoors, Bromley. The British Museum (Natural History) had informed the exhibitor that this species had been recorded from Colchester, Aberdeen and Edinburgh and also from mines. The exhibitor had seen the species in the wild in Northern Italy; (b) Apple leaves from his garden at Bexley shewing an abundance of mines of *Lyonetia clerkella* (L.) (Lep., Lyonetiidae) and remarked on the almost entire absence of *Phyllonorycter blancardella* (F.) this year; (c) A cocoon mass of *Aphomia sociella* (L.) found in an old bumble-bee's nest amongst stored fire-wood.

S. KNILL-JONES — (a) Two species of Oecophoridae from the Isle of Wight: — *Batia lambdella* (Don.) (1 ex.) taken at mercury vapour light at Freshwater, 30.vi.79 and *Esperia sulphurella* (F.) (2 exs.) taken indoors, at Freshwater, on 27.iii.78. The latter had probably hatched from a fallen birch tree in the garden, the former a local species whose strongholds in Britain are the New Forest and Isle of Wight; (b) Two examples of a Tineid taken in London in September 1979 on or in houses, probable identification: *Tinea pallescentella* (Stainton).

G. PRIOR — (a) Larvae of *Eupithecia exigua* (Hübner) which had hatched from eggs laid at end of May in North Harrow and were still feeding after four months; (b) Three undetermined case-bearers from the Isle of Wight; (c) A full-grown larva of the lime hawk-moth *Mimas tiliae* (L.) found on the Euston Road, London, about to pupate.

K. SAMUELLS — A male *Semiothisa clathrata* (L.) (lattice heath moth) taken to light on 7.vii.79 (m. trap) in Herts., a species more usually taken flying by day.

B. SKINNER — A mature larva of *Clostera anachoreta* (D. & S.) bred from a female taken on Dungeness, Kent on 4.viii.79.

ANNOUNCEMENTS

R. BRETHERTON drew the attention of those present to notices regarding the annual exhibition and dinner and the banker's order for the new subscription, and appealed for records of immigrant lepidoptera to Britain for himself and B. Chalmers-Hunt to edit.

MEMBERSHIP

The names of the following candidates were read for the first time: C. R. Henshaw, D. M. Rainsford, P. E. Smart and N. D. Evans.

COMMUNICATIONS

Dr. C. G. M. DE WORMS mentioned that the great Danish entomologist Bishop Skat Hoffmeyr had recently died and paid tribute to his achievements. He then reported that *Apatura iris* (L.) the purple emperor, had continued to fly until the last week in August commonly near Chiddingfold and had been reported from Ranmore Common amongst pine trees together with *Ladoga camilla* (L.). There had also been immigrations in June and August of *Pieris brassicae* (L.) which had been numerous in England this summer, and reports of *Vanessa cardui* (L.) and *atalanta* (L.) seen arriving on the south coast, likewise *Rhodometra sacraria* (L.). He had heard also that Dr. Peat of Guernsey had at last succeeded in capturing *Pelusia obtusa* (H.-S.) at Hickling, Norfolk this summer. He had also received from C. Plant a specimen of *Maruca testulalis* (Geyer) (Lep., Pyralidae), a rare moth in England though a bean pest elsewhere.

R. F. BRETHERTON reported that the Ministry of Agriculture had started publishing lists of moths intercepted by the Customs officials in cargoes, etc., in 1976-77, and a similar list for 1978 was expected in due course. He was considering the need to include these in the list of British Lepidoptera. At his Surrey light-trap he was able to report that a good variety of species had been noted but little of distinction. In one night in September 50 different species of Macro-lepidoptera and Pyralidae had been noted, a high figure for so late in the season; many Geos were flying in a second brood despite the cold start to the season.

J. M. CHALMERS-HUNT reported that on a chalk-down in Kent on 14th July he had found two Satyridae flying in cop., and that both were males, but of two different species, namely *Pyronia tithonus* (L.) and *Maniola jurtina* (L.), gate-keeper and meadow-brown. On the same day he had taken a fresh-looking *Pyrgus malvae* (L.), dingy skipper, a very late date for it, and also a mint-quality albino *M. jurtina*. He also mentioned that a few *Colias croceus* (Fourcr.) had been reported from E. Kent, the Isle of Wight, and Dorset.

A. STUBBS made a statement regarding the reported extinction of the large blue (*Maculinea arion* (L.)) and a Nature Conservancy Council press hand-out regarding this conclusion was made available to interested members. It referred to the one officially recognised colony of this butterfly in Devon, the adverse effects of the droughts of 1975 and 1976 and the poor weather in the following two years. No viable eggs were laid by the only fecundated female at the protected site this year. The habitat will be maintained in good condition and in due course the case for the reintroduction of the large blue from the Continent will be considered. This sad but not unforeseen outcome of considerable conservation efforts illustrates, as the Chairman of the Nature Conservancy Council said, "the extreme vulnerability of wild life to the progressive whittling away of habitats; the remaining scattered populations then become very sensitive to forces which a larger population might successfully overcome".

Dr. A. A. ALLEN reported that *Parocystota acroxantha* Meyr. (Lep., Oecophoridae) seemed to be increasing at Dawlish, Devon and was easy to breed; he had obtained four generations in a year.

R. K. MERRIFIELD reported that a late example of *Laothoe populi* (L.),

poplar hawk moth, had been observed on 30th August.

N. R. H. BURGESS then gave an illustrated talk on "Medical entomology in the United Kingdom". This dealt with diseases among our population due to insects in the broadest sense and the illustrations were of the insects and their habitats, such as restaurants, kitchens, sewers, wet lands. Those present shewed their appreciation by numerous questions and by applause.

27th September 1979

The Vice-President, R. FAIRCLOUGH, in the chair.

The chairman welcomed a Belgian visitor, Dr. Albert LeGrain, a student of the genus *Mythimna*.

EXHIBITS

D. AGASSIZ — A specimen (unset) of *Swammerdamia passerella* Zett. (= *nanivora* Stainton) (Lep., Yponomeutidae) from Finland and larvae of this species from Inverness, together with adults and larvae of *S. caesiella* (Hübner) and *S. pyrella* (Vill.) for comparison. *S. passerella* has been regarded as a synonym of *caesiella* in British literature of recent decades, the only previous British specimen being the type of *S. nanivora* which was bred in 1870 from a larva found in September 1869. The larva feeds on *Betula nana* in the highlands of Scotland.

Dr. A. A. ALLEN — Two species of *Apanteles* (Hym., Braconidae), the first of which, *A. callunae* Nixon, had been bred 10.viii.79 from a larva of *Eupithecia centaureata* (D. & S.) (Lep., Geometridae) which was swept from heather 29.vii.79 on Little Haldon moors, Devon. The parasite maggot spun its rather bright, lemon, cocoon on 2.viii.79. This provides a second host for this parasite-species, previously bred only from *Anarta myrtilli* (L.). The exhibitor had shewn *A. callunae*, from the same locality, a year before, bred on that occasion from an unidentifiable geometrid; additionally, he had obtained it from another geometrid from the same moorland in the present year. A tentative conclusion was that a perhaps diverse range of immature lepidopterous larvae feeding on heather and moorland was parasitised by *A. callunae*. The second example consisted of part of a brood of the gregarious species *Apanteles popularis* (Haliday) bred at intervals during 1979. The brood, one of several, was obtained from a larva of *Tyria jacobaeae* (L.) (Lep., Arctiidae) found, in the company of others similarly affected, 2.ix.1978 at Littlehampton, Sussex. The woolly white cocoons of the parasite were spun up as the host prepared for pupation, the present series resulting on 7.ix.78. The species spends a long time in the cocoon, not hatching until the young larvae of the only host recorded for the species are available. This species has long been known as a parasite for *T. jacobaeae*; it is also notoriously irregular in its incidence in any year; some years larvae quite frequently yield the parasite, while in other years larvae from the same locality are scarcely or not at all affected.

D. B. BAKER — Some Lepidoptera from Iran, referred to in his talk.

E. S. BRADFORD — (a) Specimens of *Euphyia biangulata* (Haw.) bred from eggs laid by a female taken in East Blean, Kent, 14.vii.79; not all emerged as a second generation, but the pupal stage of this generation lasted approximately twenty-two days; (b) Examples of the first Kentish recorded *Coleophora lassella* Stgr., the early stages of which are, as yet, unknown, and of *C. caespititiella* Zeller, *C. alticolella* Z., and *C. potentillae* Elisha, all taken in Thornden Wood, Kent, 9.vii.79. *C. lassella* was previously known from Southampton, Arne in Dorset and Ireland.

J. M. CHALMERS-HUNT — A live ♂ of *Clostera anachoreta* (D. & S.) just hatched from ova laid by a moth taken at Dungeness by T. W. Harman.

A. M. EMMET — Leaves of oak (*Quercus robur*), picked up at Arnside Knott, Cumbria, 14.ix.79, each containing 40 or more mines of *Ectoedemia albifasciella* (Heinemann) (Lep., Nepticulidae); this "population-explosion" seems only to be occurring in the north of England; in Essex, for example, the species is unusually scarce this year.

R. FAIRCLOUGH — Larvae of *Hypena crassalis* (F.) on bilberry from the Leith Hill area, Surrey.

T. LARSEN — Transparency of an inter-generic mating, observed in the Atlas Mts., the subject of an article in these Proceedings.

P. A. SOKOLOFF — Unbound magazines inhabited by larvae of *Plodia interpunctella* (Hüb.) (Lep., Pyralidae), in the exhibitor's library. The paper of the magazines was hardly damaged.

MEMBERSHIP

Their names having been read a second time, the following were duly declared elected as members: — C. R. Henshaw, D. M. Rainsford, P. E. Smart, N. D. Evans. The obligation book was signed by A. Valetta.

COMMUNICATIONS

E. S. BRADFORD reported that he had observed columns of flies over oak trees on 6th September at Hilfield Reservoir, near Elstree, Herts., at 5.30-6.30 p.m. on a still evening; A. E. Stubbs suggested they might be Chironomids.

E. H. WILD reported having taken a halved gynandromorph specimen of *Pandemis cerasana* (Hüb.).

T. J. G. HOMER reported having taken a single example of *Boloria selene* (D. & S.) on the Chiltern scarp on 28th August, a late date for this butterfly, or an unusual second brood.

J. BROWN stated that an example of *Lampides boeticus* (L.) (long-tailed blue) had been captured indoors at Sutton in Surrey, and that, at the Epping Forest Conservation Centre, it had been noted that *Lymantria monacha* (L.) was numerous again. A. M. EMMETT stated that this moth had recovered its usual abundance all over Essex.

D. B. BAKER then gave an illustrated talk on nature in Northern Iran, the fruits of a stay in that part of Persia of some five years. About a hundred excellent slides were shown illustrating a variety of habitats on both sides of the Elburz range and an account of the wild life was given, flowers, bees, lepidoptera, etc., being particularly shewn. The names for all were also given, except in the case of some new species awaiting description. The talk was warmly applauded.

11th October 1979

The President, Rev. D. J. L. AGASSIZ, in the chair.

EXHIBITS

A. M. EMMET — (i) Tenanted cases of *Coleophora salicorniae* Wocke (Lep., Coleophoridae) collected in Skipper's Island, North-east Essex, on the 7th October 1979. The method of feeding on glasswort (*Salicornia europaea*) was described and it was pointed out that the best place to look for the cases was the edges of the salt-marshes especially just under the seawalls; (ii) Tenanted cases of *Coleophora adjunctella* H.-S. collected at Benfleet, South Essex on the 1st October. Cases of *C. badiipennella* (Dup.) with which *C. adjunctella* was formerly confused, were shewn for com-

parison; sloe is the foodplant of *C. adjectella*, elm that of *badiipennella*. Differences in the mines, first, and second cases of the two species were described and also shewn in sketches circulated.

E. H. WILD — An example of *Drepanopteryx phalaenoides* (L.) (Neur., Hemerobiidae) taken at light in Selsdon, Surrey on 28th September 1979; this is always a rare species throughout its European range. Its present status is unknown, Killington (Roy. Soc. publ. 1937) gives its distribution as Yorkshire, Cumberland and Westmorland. There are also two old records from Sussex. It is unlikely to be overlooked in a moth-trap. A second specimen in Selsdon arrived on 9th October, suggesting that it is established locally.

MEMBERSHIP

The following names of candidates were read for the first time: — Dr. Margaret Cameron, Messrs. M. J. S. Hubbard and de Courcy Henshaw.

COMMUNICATIONS

R. F. BRETHERTON said that up to the end of September there had been comparatively little immigration, although a few *Rhodometra sacraria* (L.) and *Agrius convolvuli* (L.) had been seen; however, at the end of the first week in October there were signs of a fresh wave of immigrants, e.g. *R. sacraria* and *Mythimna albipuncta* (D. & S.). D. J. L. AGASSIZ confirmed that these two and also numerous *Phlogophora meticulosa* (L.) had been noted. J. M. CHALMERS-HUNT said that *Nymphalis antiopa* (L.) had been seen in West Kent. G. PRIOR stated that some of the larvae of *Eupithecia exigua* (Hübner) referred to by him at the last meeting were still feeding.

M. BROWN reported that the Secretary of State for the Environment had decided that Darenth Wood, Kent should be spared.

A. M. EMMET reported that 40 specimens of *Gortyna borelii lunata* Freyer had been counted on the night of 6th October 1979 on Skipper's Island, Essex, at rest on the foodplant or adjacent herbage. This was higher than the numbers observed in similar counts made in previous years.

J. MUGGLETON then inaugurated a discussion on conservation summarised in the immediately following report.

RARE SPECIES OR WHOLE HABITAT—THE CONSERVATIONIST'S DILEMMA

by JOHN MUGGLETON

(32 Penton Road, Staines, Middlesex, TW18 2LD)

For a long time I have felt that there is a dilemma whether to conserve rare species or whole habitats. If resources were limitless this would not be a problem but as resources are limited how do we choose to employ them? It seems to me that in the United Kingdom the emphasis is largely on conserving rare species, indeed to such an extent that we have the ridiculous situation where a species may be protected by law but not its habitat.

It is worth asking how this situation has arisen, and I would suggest that the answer lies with the emotional appeal, or 'glamour', of a rare species rather than any scientific or practical value. Of course such appeal makes it easier to raise funds and a single species is perhaps more tangible than, for example, a piece of rich grassland or ancient woodland. After all the layman can see for himself that there are still plenty of woods so why save this particular one?

However we should first define what we mean by a rare species. Is this a species that is rare in the British Isles, in Europe or in the World? On a worldwide or European basis we have very few species in the United Kingdom that are truly rare. The large blue butterfly, *Maculinea arion* (L.), has been in the news recently and would certainly be regarded as rare in the country and yet abroad it is one of the most widely distributed of the Lycaenid butterflies. Thus it is by no means a true rarity and most of our rare species fall into this category — elsewhere they are common. Why then go to the trouble and expense to conserve them here where their very rarity suggests that conditions are marginal for them. There is the obvious aesthetic or emotional appeal and it may be argued that no better reason is needed, but is there any other reason? One scientific reason put forward is that we are conserving genetic material, but I suggest that this is a fallacious argument. Since the British populations were derived from Continental populations the British and Continental animals share the same genetic material. However the isolation of the British populations must mean the amount of genetic variation in them is now much reduced in comparison with the Continental populations. So it is unlikely that any unique genetic material will be lost if the British populations die out. It is true that new mutations will have arisen in the British populations during the years of isolation and that new combinations of genes will have come together but there is no reason why the same mutations and combinations will not have occurred elsewhere.

For a species that is truly rare, that is, it is found in the British Isles and nowhere else and even here it is rare, conservation cannot be objected to. Even so we might ask ourselves whether it is possible to conserve truly rare species. Rare species are inevitably found in small isolated populations and will be vulnerable not only to unpredictable disasters but also to inbreeding depression and genetic drift. It has been denied that the deleterious effects of inbreeding are a problem and it has been pointed out to me that some species of insect can be inbred for many generations. This is true but I must point out, as I am sure many of you will know from personal experience, that there are many species of insects that cannot survive more than one or two generations of inbreeding. In spite of denials by those at the Institute of Terrestrial Ecology concerned with the conservation of *M. arion*, I have always believed that genetic isolation was the true reason for the collapse of the remaining *M. arion* colonies. Indeed on this basis my colleague Brian Benham was able to predict in 1971 that *M. arion* would be extinct in Britain by 1980. It is gratifying to see from press reports that the Nature Conservancy Council is now admitting that isolation may have had something to do with the decline of *M. arion*. If this is true for *M. arion*, then for how many other species is the end inevitable? Would we not be better off conserving habitats, where there are rich communities of plants and animals, regardless of whether or not rare species are present.

THE PROPOSED WILDLIFE AND COUNTRYSIDE BILL

(The following is a brief resume of some of the proposals in a consultation paper circulated by the Department of the Environment in August 1979.)

It is intended to incorporate new provisions into the Conservation of Wild Creatures and Wild Plants Act 1975. These would provide for a new category of 'vulnerable species' which, whilst not in imminent danger of extinction, are likely to become so. The vulnerable species would have the

same protection as 'endangered species' except that the vulnerable species could be taken for identification purposes provided they were released unharmed. Both vulnerable and endangered species would be protected against wilful disturbance. The definition of wild creature would be widened to include not only eggs, larvae and pupae but also other immature stages. The maximum penalty for an offence would be increased to £500. An appendix lists the vulnerable creatures to be given protection and these include nine insects, *Carterocephalus palaemon* (Pallas) (in England), *Mellicta athalia* (Rott.), *Siona lineata* (Scop.), *Pareulype berberata* Schiff., *Chrysolina cerealis* (L.), *Aeshna isosceles* (Mueller), *Decticus verrucivorus* (L.), *Gryllus campestris* (L.) and *Gryllotalpa gryllotalpa* (L.). (I understand that other species have now been removed from this list.)

A further proposal is intended to give protection to habitats and would allow a small number of selected sites to be named where landowners or tenants would have obligation to give twelve months' notice to the Nature Conservancy Council of their intention to undertake practices which could be detrimental to the scientific interest of the site. The NCC would be empowered to protect these sites. The sites would be selected according to one of two criteria, either where a change in practice would imperil the future in Great Britain of one or more species of fauna or flora native to this country or where it was necessary to meet an international obligation specific to a named site.

DISCUSSION

Mr. J. HEATH had not expected to reply but because of his previous association with the Nature Conservancy he felt he could make some useful comments. Almost all nature reserves are devoted to habitat conservation and some are large, e.g. Cairngorms. He drew attention to the forthcoming *Red Data Book*, which would indicate those species in need of conservation, and also the recently published *Nature Conservation Review* which listed important sites. He was worried that the proposals to protect habitats would not be effective but he believed that lessons had been learnt from work on *M. arion* and *Papilio machaon* L. which could be applied to other species.

Mr. S. A. KNILL-JONES believed that if collectors sent records to the Biological Records Centre, action could be taken when species appeared to be in danger. A government fund could be set up to compensate landowners. (His views are recapitulated under Correspondence. — *Editor*.)

Mr. R. P. BATEMAN thought that Orthoptera were particularly vulnerable to collecting because of their habits and habitats and that they may benefit from the proposals in the Bill on collecting. The size of nature reserves is important and to be viable they should be large areas. There may be large numbers of nature reserves but many are restricted in area. He pointed out that many of the rare species are at the edge of their range so their disappearance is not surprising. He also drew attention to Dr. Miriam Rothschild's suggestion that farmers should be induced not to use insecticides near the boundaries of nature reserves.

Mr. M. BROWN asked if Mr. Muggleton could elaborate on the unimportance of the genetic material of rare species. Surely populations at the extremes of their range would be important in producing new species.

Mr. J. MUGGLETON had not thought of the possibility of rare species as potential new species. His argument was that no genes would be lost because the English material was derived from Continental material.

Dr. D. LONSDALE was in general agreement with Muggleton's opening remarks. He thought that insect conservation was at a disadvantage because of public ignorance about rare unattractive species. Another problem is that little is known about the distribution of many insects and there may even be unknown species that are rare. He believed that there was a tendency to neglect rich habitats that do not contain rare species. Some habitats are neglected because they are not associated with rare species, e.g. rotting wood. He thought, that insect conservation suffers because of too much emphasis on birds and that rare species conservation is going against ecological considerations.

Mr. C. HART believed that the proposed Bill would not be effective enough to protect habitats when large amounts of money were involved.

Mr. J. HEATH agreed that there was a need to educate the public. With regard to habitat protection he was afraid that financial and political interests would be paramount. In comparison with the large amounts of money spent elsewhere, the government allows little money for conservation.

Mr. E. H. WILD asked if we had considered who or what we were conserving for, and how many people are interested?

Mr. R. P. BATEMAN agreed that little money is available but questioned the strategies of the Nature Conservancy Council. For example only small pieces of land are being obtained for rare species, would it not be better to buy larger pieces of land.

Mr. J. HEATH could not comment on the strategies of the NCC. The acquisition of land would only take place with the co-operation of the owners. The government is unlikely to use compulsory purchase powers.

Mr. E. H. WILD ended the discussion on a light note. He had heard that the phrase 'other stages' had been inserted in the proposals because the Lords were confused by references to 'nymphs'.

8th November 1979

The President, Rev. D. J. L. AGASSIZ, in the chair.

The President announced with great regret the death of Dr. C. G. M. de Worms and stated that a memorial service at St. Martin's in the Fields would take place on Thursday 29th November.

EXHIBITS

Dr. A. A. ALLEN — Three species of *Apanteles* (Hym., Braconidae): (a) A female of *A. vitripennis* (Curtis) bred 18.vi.79 from a young larva of *Lithophane leautieri* (Boisd.) (Lep., Noctuidae) which was beaten from *Cupressus* Sp. Brownsea I., Dorset, 1.vi.79. The host yielded the parasite maggot on 8.i. on which date its cocoon was spun. Several larvae were thus obtained but only one gave rise to *A. vitripennis*. This is possibly the first record of a parasite having been bred from the larva of this moth in England. *A. vitripennis* is a common, solitary, relatively non-specific parasite of lepidoptera larvae and therefore likely to attack this host, for which specific parasites may later appear; (b) Two females of *A. falcatus* (Nees), one of the largest species of British *Apanteles*. Notwithstanding its size, it is a gregarious parasite, apparently exclusively preying on *Apamea monoglypha* (Hufn.) larvae. Undoubtedly the female's long thick curved ovipositor enables the rather secretive host larva to be attacked. Both specimens were swept at Tywardreath, Cornwall, in a rough, disturbed field on 8.viii.79. Many specimens were taken in the south-west in August 1979 by the exhibitor.

A. M. EMMET — The early mine and two larval cases of *Coleophora limosipennella* (Dup.) taken at Purfleet, Essex, on 1.xi.79, with mines of *C. badiipennella* (Dup.) for comparison. The pre-hibernation feeding of this species was hitherto unknown.

ANNOUNCEMENTS

The Librarian announced the receipt of the collection of books and journals of the late C. G. M. de Worms and appealed for help in cataloguing these. Until this was completed nothing should be borrowed from the bequest.

MEMBERSHIP

After a second reading of their names, the following were duly declared elected as members: — Dr. Margaret Cameron, and Messrs. M. J. S. Hubbard and de Courcy Henshaw.

COMMUNICATIONS

Various members made reports on immigrants but the general consensus was that it had been a poor year for these. E. H. WILD submitted statistics from trap records at Selsdon, Surrey. Except for August and September these indicated that 1979 had been better than the average for the last three years. The average for five years was distorted by the high record for 1976. Figures showed that the hard winter of 1978/79 favoured species and numbers during the first half of 1979, but the poor weather during that time delayed larvae feeding up; consequently October numbers included many species normally at peak in August and September. Such species as *Aporophila nigra* (Haw.), *Omphaloscelis lunosa* (Haw.) and *Dichonia aprilina* (L.) had ceased to appear at Selsdon by the end of the first half of October but fresh specimens of these were appearing in the last week of that month in the West Country, doubtless due to the severe weather there earlier in the year.

A discussion on the exhibition then ensued various members present singling out for favourable comments different exhibits. A. E. Stubbs considered that "other orders" and "photographic exhibits" were more numerous than previously.

Slides were then exhibited by Messrs. A. A. Allen, D. J. L. Agassiz, M. Chalmers-Hunt, C. Hart and E. P. Wiltshire.

22nd November 1979

The President, Rev. D. J. L. AGASSIZ, in the chair.

EXHIBITS

Dr. A. A. ALLEN — (a) About twenty third-instar larvae of *Eumichtis lichenea* (Hübner) (Lep., Noctuidae) bred from ova laid by a female taken at actinic light 13.x.79 in Dawlish, Devon, feeding well on rather withered dandelion leaves; also two young larvae of *Euproctis similis* (Fuessly) each in its own hibernaculum, a tough white web. Larvae of this species spend the winter thus cocooned, appearing to resume feeding in spring; these were found on a *Salix* sp., taken 23.ix.79 on Brownsea I., Dorset, and spun their hibernacula in mid-October. (b) A female specimen of *Macrocentrus nitidis* (Wesmael) (Hym., Braconidae) swept from cliffs at Dawlish, Devon, 28.vii.79 in the evening. It is a solitary internal parasite on larvae of Tortricidae living in concealment and is considered a rather rare species; also a living female of *Stenichneumon culpator* (Schrank) (Hym., Ichneumonidae) found, with others, in dead logs on Haldon Moors, Devon, 13.x.79. The exhibitor had found very numerous examples of this insect in mid-April 1979; autumnal captures represented hatching from

Plusiinae pupae in late summer; the female wasps would attack mature over-wintered larvae of this moth sub-family in the spring. Attention was drawn to the prominent tubercle on the under-side of each hind coxa, a character which allows the female to be recognised once the genus has been determined.

E. S. BRADFORD — Twenty larvae of *Blaps mucronata* Latreille (Col., Tenebrionidae) found breeding in a fish tank; he had also found a pupa and two large larvae were still alive, having a very long life-cycle. An adult had also been observed.

I. F. G. MACLEAN — The ovisacs of an *Eriopeltis* sp., (Homoptera, Coccidae) collected from *Brachypodium pinnatum* at Dry Sandford, Oxon. 10.X.79. Also an example of *Leucopis silesiaca* (Dipt., Chamaemyiidae), which is a specialised larval predator on scale insects. Few records are known of this *Leucopis*; as there is a possibility of other closely related species, known at present from Europe, occurring in Britain, members were asked to pass on any materials of scale insects found.

MEMBERSHIP

Their names having been read a second time, the following candidates were duly declared elected members: — Mrs. J. Z. Dobson, Miss S. Herbert, Messrs. M. E. Cole, G. R. Strange, D. J. Haggett, S. Langlois, S/Lr. R. Parker, Messrs. C. E. Pearce, B. T. Newman, G. L. Heritage, A. C. Grange, N. J. Spiller, O. A. Holder, G. K. Simmons, Miss D. A. Barker, Messrs. P. J. Cramp, R. A. Cramp, and N. M. Hall, M.A.

The obligation-book was signed by J. L. Beaton.

ANNOUNCEMENTS

The memorial service in memory of the late Dr. C. G. M. de Worms would be held, it was announced, on Thursday 29th at St. Martin's-in-the-Fields at noon.

COMMUNICATIONS

J. M. Chalmers-Hunt reported that he had had the first emergence of an adult from a pupa of *Chrysodeixis chalcites* (Hübner) bred from ova laid by a female taken at light at St. Mary, Glamorgan, S. Wales, early in October.

J. D. Hollway then delivered an illustrated talk on "Norfolk I., a biogeographer's dream". The island was situated about mid-way between New Zealand, New Caledonia, and Australia, and illustrated the trans-oceanic migrations of lepidoptera in the sub-tropical latitudes. No antipathy by the audience to antipodean flora and fauna was shewn and the talk evoked interest and applause.

13th December 1979

JOINT MEETING WITH THE ROYAL ENTOMOLOGICAL SOCIETY

The President, Rev. D. J. L. AGASSIZ, in the chair.

The second joint meeting took place at the Alpine Club, 74 South Audley Street, and it well attended.

The President announced with great regret the death of a member, Mr. K. C. Side, and members shewed respect in the usual way.

EXHIBITS

Admiral A. D. TORLESSE — exhibited an example of the rare immigrant moth *Cornutiplusia circumflexa* (L.) dubbed the Essex "Y" and the Yorkshire "Y" by Haworth and Donovan respectively, this and early examples having perhaps been imported by ship, or immigrated naturally; the example exhibited was taken in Hampshire on 29th July 1979.

H. C. J. GODFRAY — A leaf containing perhaps 130 mines of *Ectoedemia subbimaculella* (Haworth) (Lep., Nepticulidae) (from Ascot, Surrey).

MEMBERSHIP

The name of I. L. Brydon was read for the first time.

COMMUNICATIONS

Mr. R. I. VANE-WRIGHT reported having received from the Ulster Museum Ceylon butterfly paintings made apparently by R. Templeton, a nineteenth century naturalist, about whom he hoped to publish details shortly.

A discussion then took place on Insect Immigration in the Old World and Palearctic Zone, to which the principal contributors were R. F. BRETHERTON and Dr. R. C. RAINEY. Their speeches are abstracted below; half a dozen of the audience later joined in the discussion before all partook of refreshments.

INSECT MIGRATION IN THE NORTHERN HEMISPHERE, WITH PARTICULAR REFERENCE TO THE BRITISH ISLES

Mr. R. F. BRETHERTON opened the discussion with a brief account of the migration of Lepidoptera to the British Isles. He emphasised that we are essentially at the receiving end, though with slight indication of internal and outward migration in a few species. We have good information about the arrival and later behaviour of immigrants, but very little about how, where and why they start, on which he hoped that Dr. Rainey would elaborate.

At least 160 species of our listed Macrolepidoptera and Pyraloidea reach the British Isles as immigrants: this includes some which are also permanently or temporarily resident. About twenty of the purely immigrant species, both butterflies and moths, come every year, though in very varying numbers; they may produce a summer generation here, but do not normally overwinter. A further fifty are more or less frequent visitors, some of them in good numbers. More than sixty others have been recorded only in very few or single examples; they should not, however, be regarded as "accidentals" or "vagrants", since most of them can be shown to have arrived along with other immigrants. Their apparent rarity probably results from the very small chance, even today, that any individual migrant will be caught, identified and recorded: one such record may exemplify many hundreds or even thousands of arrivals.

Immigrants do not contribute very much to the total lepidoptera population in Britain, even after allowing for summer breeding, except in abnormally good years near the south and west coasts. At an inland light trap in Surrey, over fifteen years immigrant species accounted for 1.6% of the total attendance, with a range in single years from 5.5% to 0.15%. But they do provide a main dynamic for the fauna. Since 1945 they have provided species new to the British list at an average rate of more than one a year: many species have become resident or temporarily established, almost certainly by initial immigration; several long resident species which have experienced local decline are reinforced or maintained by immigrant stock. Immigration links our insular fauna to changes on the Continent and makes possible additions to it whenever climatic or other conditions are favourable.

Some aspects of the problems of origin determination were then illustrated with the help of map and slides. Great progress has undoubtedly been made in the past twenty years by the recognition that our immigrant lepidoptera

are largely wind-borne, with the consequent practice of "back-tracking" with the help of meteorological information about long-distance wind currents. But the speaker was rather sceptical about the precise pin-pointing of places of origin sometimes so arrived at, since this is dependent on the assumption that immigrants fly closely down wind, without independent orientation of their own. This appears to be unproven for moths, and contrary to many observations of the flight of butterflies in Britain, at least over land. He hoped that recent developments in the use of radar for tracking insects might throw more light on this. It is, however, already possible with fair assurance to place many of our immigrant species as coming to us from very various directions and over distances which are sometimes as much as 1,500 or 2,000 miles.

INSECT MIGRATION: SOME RECENT FINDINGS

by R. C. RAINEY

(formerly of Centre for Overseas Pest Research)

The African armyworm (*Spodoptera exempta* Walk., Noctuidae) attacks cereals and grazing in many countries, with a severity which is illustrated by the hundred of reports of the gregarious black larvae which come from farmers and the general public. Such reports on the incidence of the larvae, complementing the data on the moths of this species which are provided by international networks of light-traps and pheromone traps, have in fact been found to help very materially in providing sufficient information to enable the movements of whole populations of this migrant pest to be mapped, like those of locusts, throughout sequences of generations, in a manner not yet possible for the migrant Lepidoptera which reach Britain. With the life-cycle of about a month, and the rarity of any resting stage, the monthly sequences of larval attack reflect the migrations of successive generations of the moths, flying by night for many hours at a stretch in a way now being intensively studied by Derek Rose and his colleagues in East Africa, by direct observation and by radar as well as in the laboratory (earlier radar observations on insect flight, reported in detail by Schaefer (1976), incidentally included the tropical Pierid migrant *Catopsilia florella* Fab., flying up to 1,500 m above the ground and heading cross-wind out into the Sahara). Infestations of *exempta* larvae in October and November 1976 in Malawi and Rhodesia, for example, were followed by attacks successively northwards across Tanzania during December 1976 and January 1977, across Kenya (into the Northern Hemisphere) during February, March and April, and across Ethiopia and into the Yemen Arab Republic in May 1977, as well as by a southward spread from Rhodesia into the Transvaal in December 1976, into the Orange Free State and Lesotho in January, and on into Cape Province and Namibia in February 1977. Basically similar sequences at corresponding times of year occur to varying extents in most years (Brown, Betts & Rainey 1969; Rainey 1979).

Earlier work had shown how Desert Locust swarms (*Schistocerca gregaria* Forsk.), travelling consistently with the winds in which they fly (and even moving in complete loops with appropriate sequences of wind-direction), eventually reach zones of wind-convergence which provide the rains necessary for their successful breeding. African armyworm moths have likewise been found to concentrate in zones of wind-convergence, as shown for example by massive light-trap catches recorded (Haggis 1971) at the times of wind-shifts, between east and west, which mark passages of the African Rift convergence zone across the Nairobi area — and also like

the spruce budworm moths (*Choristoneura fumiferana* Clem., Tortricidae) recently observed in unprecedented detail by airborne radar as they accumulated in the converging winds at a New Brunswick sea-breeze front (Schaefer 1979). Radar observations have also emphasised how the flight of the night-flying spruce budworm moths is often limited by low temperatures, which have on occasion inhibited flight at low levels while in warmer air above 100 m or so densely-flying moth of this species could still be seen on radar and trapped by aircraft.

The uniformity of orientation which is so characteristically seen within groups of flying locusts has repeatedly been found to be wholly misleading as to the direction of displacement of the swarm as a whole, by reason both of the wide differences in orientation seen between different groups of flying locusts in the same swarm at the same time, and also of the changes in orientation seen at the perimeter of the swarm as the locusts turn back and so maintain its cohesion. The extent to which the direction of swarm-displacement is determined by the wind-direction did not become obvious until evidence of the hour-to-hour and day-to-day movements of complete individual swarms became available, from aircraft observations. On the other hand, migrating butterflies such as *Catopsilia florella* can appear to vary their orientation in order to maintain a constant track relative to the ground, for as long as each individual is within sight, and in a manner apparently different from locusts (Rainey 1962), though it is not known what contribution this behaviour may make to the displacement of the butterfly population as a whole.

A few Desert Locusts reached the British Isles in October 1954, for the first time since 1869, and the trajectory of the air in which they arrived, computed by the Meteorological Office for an assumed flying height of 100 m, led back for a distance of more than 2,000 km to the vicinity of the Canary Islands, on a day on which the Islands were experiencing a massive Desert Locust invasion from the neighbouring African mainland. However, an initial trajectory which had been computed in a similar manner for winds at the not unreasonable (and more readily available) height of 450 m had led back unhelpfully to mid-Atlantic (Rainey 1963); and still greater uncertainties (biological as well as meteorological) may occur for example in tracking by overland trajectories. On the other hand, the inference of a transatlantic crossing by the American Noctuid *Autographa biloba* Steph. (found only once before in Britain), taken at Torquay on 1st October 1958 after hurricane *Helene* off the U.S. Atlantic coast and westerly winds all the way from Davis Strait to the British Isles, is powerfully reinforced by the association which Mr. Bretherton has mentioned with the records of North American waterthrush in the Scillies on the previous day (30th September) and of a Baltimore oriole at Lundy on the day following (2nd October) — the first authenticated records in Britain for both these birds.

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CURRENT LITERATURE

BOOK REVIEWS

The Moths and Butterflies of Great Britain and Ireland, Vol. 9. Sphingidae — Noctuidae (Part 1). Editors: J. Heath; A. M. Emmet. Curwen Books, 1979. 288 pp. 16 colour plates. Price £25.00.

Three years have elapsed since the appearance of Vol. 1 of this projected 10 volume series and we have waited with some anticipation for the next-in-line. Whatever the reason for the delay we now have before us an up-to-date authoritative account of a part of our Macrolepidoptera which will doubtless be of wide appeal to all lepidopterists.

Following upon the Preface by the Editors, and preceding the Systematic Section, Professor M. C. Birch gives us a lucid, detailed and well illustrated account of Eversible Structures, a topic, as the author points out, which is probably applicable to every major group of Lepidoptera but which has previously escaped mention in almost all popular systematic works. The only criticism one would make here is that it would have appeared more logical to have had this important contribution following closely upon the chapter on Morphology in Volume 1; thus leaving Volume 9 devoted entirely to the several Families with which we are more likely to be familiar.

These Families and their specialist authors are: — Sphingidae (Cdr. W. L. R. E. Gilchrist); Notodontidae, Lymantriidae and Arctiidae (the late Dr. C. G. M. de Worms); Thaumetopoeidae and Ctenuchidae (J. Heath); Nolidae (R. J. Revell); and Noctuidae: Noctuinae and Hadeninae (R. F. Bretherton, B. Goater and R. I. Lorimer). There has been a beneficial change of format from that followed in Volume 1. The heading 'Life History' now precedes the sub-headings ovum, larva, pupa and imago thus allowing the details of structure to be complemented by those related to ecology. As pointed out by the Editors this eliminated some repetition which occurred with the earlier format. Information relating to each species is excellently set forth and elicits little criticism though in one or two instances the distributions seem a little thin and could bear expansion. *Hyloicus pinastri* (L.) for example has been resident in Berkshire for 25 years and is also known from Oxfordshire, Buckinghamshire, Sussex and Kent. Researching the literature for records can be a tedious occupation and it is virtually impossible for everything to 'remain in the sieve'. It is therefore unfortunate, when having included brief mention of the Family Thaumetopoeidae and instancing Bachelor's Kentish Buccaneering *T. pityocampa* (D. & S.), the 1966 record of this moth from a trap at Burghfield, Berkshire was overlooked (Entomologist 101: 10). The sizes of

the Families (or portions thereof) included in Volume 9 are inevitably disproportionate and therefore we find the Noctuidae: Noctuinae and Hadeninae occupying well over half of the entire book, and what splendid reading is to be found in this lion's share. The information on individual species one accepts without question, coming as it does from a triple authorship of immense experience, but how fitting it is to see this information preceded with some undiluted pages on Life History, Behaviour and Rearing. Dot distribution maps, provided by the Institute of Terrestrial Ecology, Biological Records Centre, are liberally spread throughout the text, and special 'graded' maps, devised by R. F. Bretherton, bring to life the visitation of migrants to our shores. The dot distribution maps are compiled from records sent in by a large number of participant lepidopterists and give a broad picture of a moth's territory in Britain, but does *Mythimna litoralis* (Curt.) really extend inland as far as we are led to believe?

The 13 colour plates by Brian Hargreaves tend to 'grow on one', though some of the commoner hawkmoths appear to be rare varieties and kittens now seem to possess longer wings than in earlier days! The three plates of colour photographs of imagines and larvae are an innovation of this volume and tempt one to look for the text of Volume 10. The line drawings of Maureen Lane are clear and informative, though a little more labelling on those depicting genitalia would not come amiss. A comprehensive General Index and Index of Host Plants complete this outstanding work. Let us hope that it will not be too long before the remainder of the Noctuidae come home to roost and that they will be joined at respectable intervals by the rest of our Lepidoptera.

B.R.B.

British Tortricoid Moths, Tortricidae: Olethreutinae, by J. D. Bradley, W. G. Tremewan and Arthur Smith. viii + 336 pp. + 42 pl. (21 coloured): Ray Society; obtainable from: Publications (Sales) British Museum (Natural History), large 4 to. Price: £40.

Although most of our Tortricina were described many years ago, until the present century little was done to present the family coherently. When I expressed to the late John Durrant my wish to study the family, he advised me to wait until someone had improved on S. J. Wilkinson's *British Tortricidae* (1850). However, I contented myself with Edward Meyrick's Revised Text Book to set out my British collection, and I brought it up to date with the various catalogues issued by I. R. P. Heslop and the two editions of the Kloet and Hincks' *A Checklist of British Insects*. C. G. Barrett's very good coloured illustrations were, perhaps, the first attempt to present good coloured figures, although many papers on the subject showed excellent black and white figures of the particular species under discussion. Barrett's last two volumes were not readily accessible to me, the remainders havng been destroyed when the Stationery Office book store was burnt during the 1914-18 war.

The present volume, therefore, may be considered to complete the study started with the first volume in 1973, so that an illustrated work, possibly approaching finality in the taxonomy of the Tortricoid moths of Britain, is now available, in spite of the many difficulties inherent with this age. It provides a lasting coverage of its subject of luxurious quality.

The preface gives acknowledgment to a large number of bodies and people who have assisted in various ways with its production, mentioning

particularly the generous grant received from the Royal Society.

The Introduction includes a long list of species of economic importance, set out under scientific, and, where existing, common names, followed by a brief note of the plants infested and the nature of damage. Forty-nine species are mentioned, including four imported species which cannot be considered as residents. This followed by a synonymic list of species treated in the text, which follows. The descriptions are set out in the same form throughout the book, commencing with name and synonymy, then descriptions of the male and female, then comments, biology, and distribution. Where necessary, that is, where not shown in Pierce and Metcalfe, genitalia are figured by Mr. Tony Sutton, points of importance being arrowed.

From page 104, 21 half tone plates illustrate the feeding habits of 73 species, beautifully and clearly drawn by Arthur Smith. These are followed by the remainder of the descriptive text, after which there is a list of food-plants and their attached species. The wild plants follow the nomenclature of *The Concise British Flora* by W. Keble Martin and the cultivated plants *The Oxford Book of Food Plants* by Harrison. This list covers sixteen pages.

The coloured plates illustrating the imagines, enlarged to approximately 2.4 times natural size, totalling about 500 specimens. These have been carefully selected to cover sexes and variation, and are the work of Mr. Brian Hargreaves; they show an excellent attention to detail and a high degree of accuracy and artistry. The figures occupy the right hand page, with names of species and localities of the specimens figured on the left hand side.

The plates are followed by eleven pages of bibliography, and finally five pages of index.

The print is admirably clear and on good paper, and the book is well bound with stiff cloth covers. The book is undoubtedly essential to all libraries and institutions concerned with entomology, and will make a treasured addition to the book shelves of amateur entomologists interested in this very handsome family of the Micro-lepidoptera.

S.N.A.J.

The Generic Names of Moths of the World. Edited by I. W. B. Nye; vol. 3, **Geometroidea**, by D. S. Fletcher (British Museum (Natural History), 1979).

Over the past fifty years, entomologists have been bewildered and dissatisfied with the frequent nomenclatorial changes of the species they know. Their generic and specific names have proved unstable, despite hopes that the application of the principle of priority and the procedures of the International Code of Zoological Nomenclature would bring finality. The practice has been to follow the authority who applies these, if he publishes a convincing case for a change. In case of disputes, the I.C.Z.N. has issued decisions. It would seem that many authorities, proposing changes, have not thoroughly researched the question; and the ordinary entomologist, having even less time to study it, has, despite misgivings, followed their proposals. The die-hards have died out, the younger have followed the latest authority, and change has followed change.

The British Museum's series, of which the third volume, with 4,082 genus-names of Geometroidea, now appears, is a step towards stability, as it provides taxonomists all over the world, who may be tempted to propose a change based on their morphological studies, with the widest

possible objective literary base on which to make proposals.

The Super-family Geometroidea, as here presented, contains twelve families: Apoprogonidae, Axiidae, Callidulidae, Cyclidiidae, Drepanidae, Epicopeiidae, Epiplemidae, Geometridae, Pterothysanidae, Sematuridae, Thyatiridae and Uraniidae. Of these only three are native to the British Isles, viz.: — Drepanidae with eight British species, Thyatiridae, with 12, and Geometridae with 315. The third volume appears before Dr. Nye's own Vol. 2 and follows his first volume (Noctuidae and Agaristidae) in aim, scope and style, but differs in having been type-set by computer. Its format is also slightly larger (21 x 30 cm). The introduction contains a discussion of the dates of some important publications, the conclusions of which, of course, affect families outside the Geometroidea as much as those within the group.

It goes without saying that D. S. Fletcher's latest contribution to the fundamental systematics of the world lepidoptera is first class, as anyone who has seen his arrangement of the British Museum's vast collection of world geos, representing a life-time of patient and impeccable work, will expect.

Many generic revisions, however, are still required before finality of nomenclature can be reached, revisions which will authoritatively decide questions of subjective synonymies and extent of genera. All such revisions must in future take the data presented by the British Museum's series into consideration.

For any macro-lepidopterist who may feel that the study of aberrations or migrants of the British Isles has been sufficiently pursued by others, here is a field crying out for serious study; the finest card-index and collection of lepidoptera in the world, those of our own South Kensington Museum, are accessible to the serious student and beckon to him.

E.P.W.

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

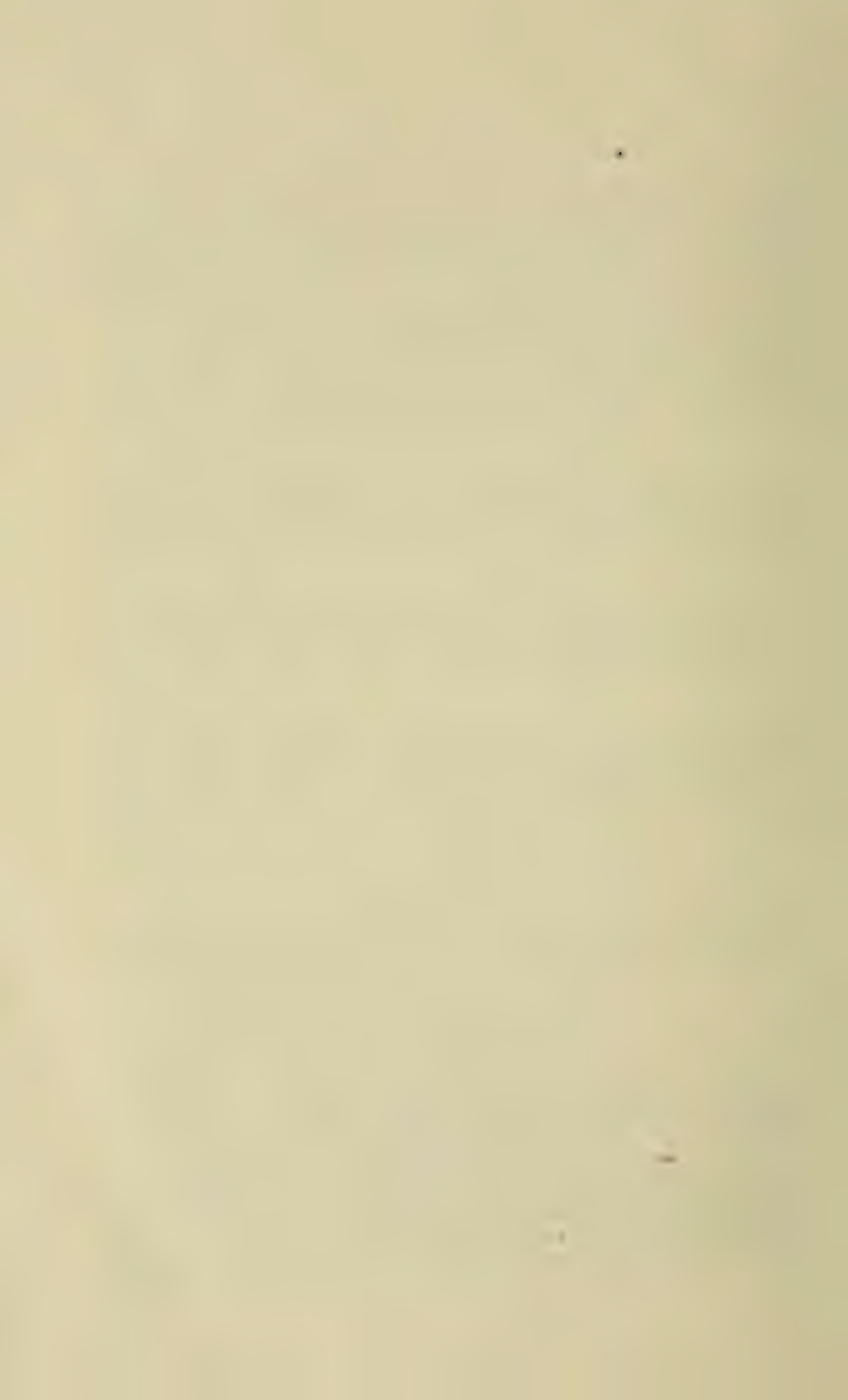
The British Entomological and Natural History Society announces that awards may be made from this Fund for promotion of entomological research with particular emphasis on:

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The Society's Publications

ILLUSTRATED PAPERS ON BRITISH MICROLEPIDOPTERA

Still available, a small number of copies of the recently published volume of twelve articles reprinted from the "South London" Proceedings between 1944 and 1957 with the twelve original colour plates.

These papers comprise LAMPRONIIDAE and ADELIDAE, LITHO-COLLETIS and OECOPHORIDAE (three parts) and ALLIED FAMILIES by S. N. A. Jacobs; PSYCHIDAE, PLUTELLIDAE and GLYPHIPP-TERYGIDAE and ALLIED GENERA by L. T. Ford; CALOPTILIA and LYONETIIDAE by S. C. S. Brown; ERIOCRANIIDAE and MICROP-TERYGIDAE by J. Heath and MOMPHA by S. Wakely. For ease of use the pages and plates have been renumbered and are fully indexed accordingly; in addition there is a new appendix drawing attention to species belonging to these groups which have been added or sunk. There is also a list of species which relates names used in the text to up-to-date nomenclature and classification.

A *limited* edition of 500 copies was published in the Autumn of 1978, bound in cloth, price £9; £6 to *Members of the Society*. Postage, where applicable, 60p extra. Cheques should be sent to R. F. Bretherton, Esq., C.B., Folly Hill, Birtley Green, Bramley, Surrey.

A FIELD GUIDE TO THE SMALLER BRITISH LEPIDOPTERA

The Society also announces the publication, last autumn, of the above important and entirely new work, bringing up to date and uniting the well-known Guide by the late L. T. Ford, B.A., and the Supplement, both hitherto advertised on this page, with much additional matter. Bound in stiff paper cover. Price and procedure for purchase, same as for the above "Illustrated Papers". A few bound and interleaved copies are also obtainable at £8, by members.

THE NATURAL HISTORY OF THE GARDEN OF BUCKINGHAM PALACE

(Proceedings and Transaction 1963, Part 2)

Compiled by a team of specialists.

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A LEPIDOPTERIST'S HANDBOOK

The Amateur Entomologist's Society is pleased to announce the publication of its latest Handbook, written by Richard Dickson. It is intended as a 'vade mecum' for both beginners and initiated lepidopterists and deals with all aspects of the subject in a series of eleven chapters and four appendices. There are 34 line illustrations and 13 photographs to augment the text and the binding has been sewen to meet constant use.

It is a practical book on the various facets of breeding, collecting, storing, conservation and photography of lepidoptera and should appeal to most lepidopterist. Although the various techniques relate to the British fauna, most are valid for lepidopterists anywhere.

The price is £3.00 plus postage and is available from A.E.S. Publication Agent, 137 Gleneldon Road, London, SW16 2BQ. (An invoice will be sent with orders, including postage).

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MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place 1st November, in Chelsea Old Town Hall.

Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings.

The current Programme Card can be had on application to the Secretary.

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OCTOBER 1980

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SLOTH MOTHS AND OTHER ZOOPHILOUS LEPIDOPTERA

by J. K. WAAGE

(Imperial College, Silwood Park, Ascot, Berks.)

Among the seven orders of insects which contain species associated with vertebrates, the zoophilous Lepidoptera are among the least known and most interesting. Perhaps the largest group among these are the eye-frequenting moths, primarily noctuids and pyralids of the old world subtropics which feed at the eyes of cattle at night. Many of these species exhibit a remarkably close association with their mammalian hosts, in a recent trip to Zimbabwe I observed *Arcyophora* sp. (Noctuidae) feeding on the eyes of oxen at night, and was amazed at their ability to orient to and land directly at the eyes of their hosts, even in very dim light. Some authors have suggested that regular feeding on lachrymation has evolved in seasonally dry subtropics where flowers and other sources of liquid nourishment are absent at certain times. That thirst may have been the initial impetus for the evolution of such behaviour is indicated by some studies I have made of water-starved *Manduca sexta* (Sphingidae). After a day or two without water, these moths would approach me at dusk and feed, while on the wing, at my eyes and mouth. Visual stimuli, and perhaps humidity receptors in the antennae may have mediated this behaviour.

An even more parasitic lifestyle is found in the bloodsucking noctuid, *Calyptra eustrigata* Hamp. in Southeast Asia. This species belongs to a group of moths known for their ability to pierce and suck fruit, with specially modified barbed probosci. It would appear that the fruit-piercing habit preadapted ancestors of *C. eustrigata* for a switch in adult diet from fruit juices to animal blood. Curiously, only males have been found feeding on blood, the female diet is unknown. Fruit-piercing moths are not unknown to England, I have found *Scoliopteryx libatrix* (L.) piercing the fruit of brambles, and in Italy this species feeds on peaches, plums and other fruit(1), but its bloodsucking relatives here, if any, are yet to be found!

Over the last five years I've been studying the remaining group of zoophilous moths, the sloth moths of Central and South America.

These chrysaugine pyralids, of the genera *Cryptoses*, *Braypodicola* and *Bradypophila*, were once thought to pass their entire life in the sloth's fur, the adults possibly feeding on blood and the larvae on sloth hair, skin and algae (which often grows on the fur). Our recent studies (2 & 3) have shown, however, that the larval stage is spent in the dung of the sloth, where caterpillars spin silken tubes encrusted with frass, which they finally seal at both ends for pupation. For no clear reason, the sloth descends at weekly intervals from the rain forest canopy to defecate on the ground, and female moths apparently oviposit at this time on the fresh dung. Adult moths emerging from the dung after pupation fly to the canopy and settle on sloths. They are easily caught in light traps *en route*. Adult moths do not feed on blood, but their reduced probosci may be used to take in skin secretions or simply water from the fur. In one species, *Bradypodicola hahneli* Spuler, moths apparently shed their wings after settling on the host, living thereafter a continuously sloth-bound existence.

In the absence of any clear benefits of feeding on the host, it would appear as though the relationship between moth and sloth is a phoretic one. Female moths associate with sloths so as to be transported to fresh oviposition sites — finding such sites while flying freely in the rain forest may be difficult, considering that sloth dung is relatively odourless and usually buried.

It would then follow that male moths associate with sloths so as to increase their chances of mating those females most likely to find larval resources for their offspring. This 'phoretic coprophage' lifestyle is not unique to sloth moths; it can be found as well in dung beetles associated with sloths and kangaroos, in other beetles, such as *Leptinus testaceus* Müller, commonly phoretic on mice in Britain and, of course, in the large community of muscid flies which associate with cattle and develop in their dung.

Other relationships between moths and vertebrates exist which are as yet very poorly known. A mammalogist colleague of mine has collected many individuals of a microlepidopteran from the fur of two species of jumping mice in Costa Rica, but this material was unfortunately lost. Dr. G. Lamas of Peru has recently brought to my attention an article by J. Bourgogne on blood feeding in a nymphalid butterfly(4). I have observed, and read elsewhere, of hesperid butterflies feeding on human sweat. No doubt many of these associations represent accidental or rare events rather than tightly coevolved associations such as found in the sloth moths, but casual associations may tell much about the conditions which permit the evolution of these more intimate association, and ultimately parasitism(5).

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PRESIDENTIAL ADDRESS

(read on the 24th January, 1980, by D. J. L. AGASSIZ)

1. TOPICAL REMARKS

You have already heard the Reports of Council and Officers and I do not want to reiterate what has been said there, but I would like to underline just two points. The first is to say how encouraged I have been by our continuing momentum of special publications; our more confident financial position should allow this to be sustained in the next few years and in this way we can be of greater service to our members. The second point concerns conservation. It has become clear that entomologists who have to collect specimens, are popularly misunderstood by others in the conservation movement, and we are greatly outnumbered by some other groups of naturalists. Were it not for the efforts of a very small number of people, field entomologists in the future might find themselves severely restricted by legislation — and this danger is not yet past. It is vital that we should be involved in (and be seen to be involved in) the conservation forum in order that our position be appreciated. It has also become clear that on every occasion where insect collecting has given rise for concern there has been a commercial interest; any members associated with such collecting of rare species will not be sympathetically viewed.

My next, and most pleasant duty, is to announce that Council has nominated two new Honorary members: C. O. Hammond and J. M. Chalmers-Hunt. Both have given much service to the Society, Cyril Hammond is also well known for his books on Flies and Dragonflies and Michael Chalmers-Hunt as Editor of the *Entomologist's Record* as well as for his historical work and his list of the Lepidoptera of Kent.

I must also pay tribute to those officers who bear the brunt of the Society's routine work, particularly the Editor and Secretary. Mr. Prior's efforts have meant that our Library is now better organised than it has been for a very long time. One consequence of holding this office is that one sees those few people who are always first to arrive and last to leave at meetings and the Exhibition, and who put in so much unseen work. In particular among the unseen workers I would like to mention Barry Goater, who in conjunction with Mr. Bretherton, has organised the distribution of circulars to members for the past 7 or 8 years and who now asks that another member should be found to take over this task.

1979 was not 'a year to remember' for entomologists, the spring was cold and the summer was late, then the autumn yielded few migrants. It has also been a particularly sad year for many of us on account of the loss of friends. Whereas my predecessor almost managed to get through the year without our hearing of the deaths of many members, this year we have lost ten of whom four had been members for over 50 years. The first three of those that follow died in 1978, but news of them only reached us in 1979.

Mr. P. Le Masurier died in July 1978. He has been a member of our Society since 1960, as a lepidopterist he was well known to many who visited the Aviemore area, where he managed a hotel and in his early days there he collected most of the local species.

Mr. D. Ollevant was a member in the early 1950s and again since 1969 and was at various times well known to members through his attendance of field meetings. His chief interest among the lepidoptera

was the Pyralidae. He was always ready to encourage younger members and for several years was secretary of the AES.

Dr. Guy D. Morrison was a professional entomologist who had been a member since 1920; he had lived and worked in Aberdeen since 1922. He was a noted authority on thrips and his published works include 'Thysanoptera of the London Area'. He was also a frequent contributor to the Entomologist's mon. Mag. in which periodical an obituary was published in October 1979 (Vol. 114 pp. 173f.).

Mr. Frederick C. Brown joined our Society in 1954. His interests included reptiles and rearing giant silk moths, as well as butterflies. His great gift was that of passing on his enthusiasm to young people and to that end he devoted most of his energies to a local young naturalists' club in Wallington where he lived.

Dr. Bernard Kettlewell died in May and so we lost one of our most distinguished members and a most colourful and flamboyant character. He had been a member since 1928 and he will always be remembered on account of the RCK collection, as well as for his studies on genetics and melanism. A full obituary by our editor has already been published in our proceedings.

Norman Riley, C.B.E. was the next great loss. Aged 88 he was by a long way our senior member having been one for 71 years, during which time he was twice President — surely a record which may never be broken. He had the unusual distinction of receiving an honour for services to entomology and for a record of these I must refer you to the obituary in our proceedings; he will also be missed for his wit and sparkle.

Mr. E. F. Williams was a prominent Essex naturalist who had been a member since 1945. He bought Skipper's Island, one of the best localities for *Gortyna borelii* Pierr., and gave it to the Essex Naturalists' Trust. Apart from his activities as a naturalist he was a leading executive of Lloyds.

Baron Charles G. M. de Worms was the last in this sequence of deaths of long serving members. An honorary member who had joined the Society in 1927, his name was a by-word amongst lepidopterists and somehow our Society will not be the same without him, even his sound effects will be missed by those who attended indoor meetings, such was the affection with which he was held. There are many things for which he will be remembered; for example one had to admire his ever youthful enthusiasm for even the most ordinary moths as each year he would comment with great authority on the state of the season. Space does not permit me to do justice to the contribution of such a distinguished past President and again I must refer you to the obituary by Mr. Bretherton published in our proceedings.

Mr. Kenneth C. Side was a Kentish member who joined us in 1960. He was one of our sadly declining numbers interested in the Coleoptera, and with his wife was well known to others at our joint meetings with the Kent Field Club.

Mr. A. R. Catlin had been a member since 1976 and lived in Bedfordshire. He was interested in the diptera, especially Agromyzidae.

2. SOME EASILY CONFUSED BRITISH MICROLEPIDOPTERA

by D. J. L. AGASSIZ

(The Vicarage, Highview Avenue, Grays, Essex.)

I now come to the second part of my address. This began in my mind with the title "Some recently separated and easily confused groups of microlepidoptera." It then struck me how many of these species were contained in the Appendix to our recently published *Illustrated Papers*. As a result the number of species in that list which I shall treat has been increased so as to make it a complete supplement, and the number of other groups, through pressure of time, has been reduced to only two genera. It is with these I shall begin.

But first I must acknowledge that in compiling this paper I have freely borrowed from other sources. The references are not given as they are adequately cited in the 'Field Guide to the Smaller British Lepidoptera' as well as in the Appendix to the 'Illustrated Papers on British Microlepidoptera' on p. 158. I must also thank those who have given advice, especially Col. Emmet, Dr. Langmaid, and Dr. Watkinson; the latter lent a specimen of *P. sagitella*. My thanks also to Mr. David Wilson for taking some of the colour slides.

The genus *Ocnerostoma* Zell..

It is almost 20 years since Friese showed that there are two species included in what we called *O. piniariella*, but the differences have never been described in British literature. Of these small grey moths both species can usually be beaten out of Scots Pine at the appropriate time of year, or else they are easily bred from larval mines; in the latter case one will probably also breed *Cedestis subfasciella* (Steph.). I would be pleased to have further information on their respective distribution. The time of the year, together with superficial differences are often sufficient to determine the species, but in many cases genitalia examination is necessary.

O. piniariella Zell. ♂ wingspan 8-10 mm., face whitish, head with greyish fuscous hairs sometimes mixed white; antennae whitish grey with indistinct light and dark rings. Forewings uniform pale grey, sometimes with a few whitish scales in middle and in dorsal cilia towards the termen.

In the ♂ genitalia the aedeagus has a sheath extending only one third of its length.

♀ wingspan 7-9 mm., face white, head with white hairs, sometimes ochreous tinged and greyer at the sides; antennae white, sometimes ringed greyish. Forewings pale grey with white scales scattered all over, especially at the apex and in the central area, hindwings grey. ♀ genitalia with ductus bursa markedly scobinate.

A single-brooded species, larvae 4-5, adults on the wing in June.

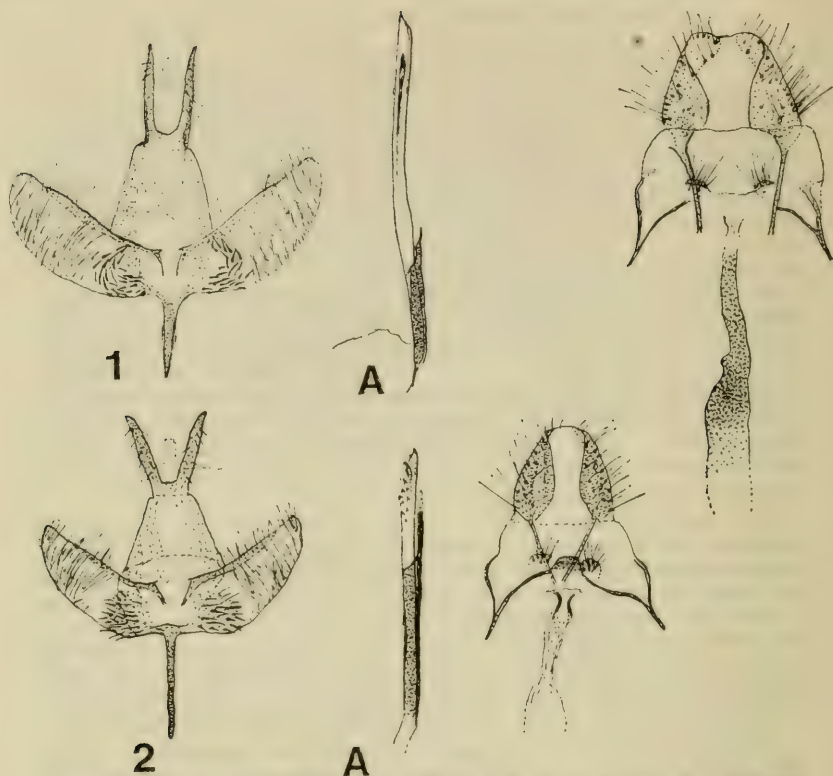
O. friesei Svensson ♂ 8-10 mm., the whole moth is grey or pale grey and in particular the antennae are wholly dark grey, except sometimes at base. The face varies from dark grey to pale grey.

In the ♂ genitalia the aedeagus has a sheath extending for $\frac{3}{4}$ of its length.

♀ 7-9 mm., face whitish, head white with some fuscous hairs; antennae dark grey. Forewings almost entirely white except for tornal cilia, hindwings grey.

The ♀ genitalia have ductus of weak tissue, not scobinate. Also posterior of the ostium there is a pad connected to the apophyses anteriores.

A double-brooded species, the larvae being found even from December



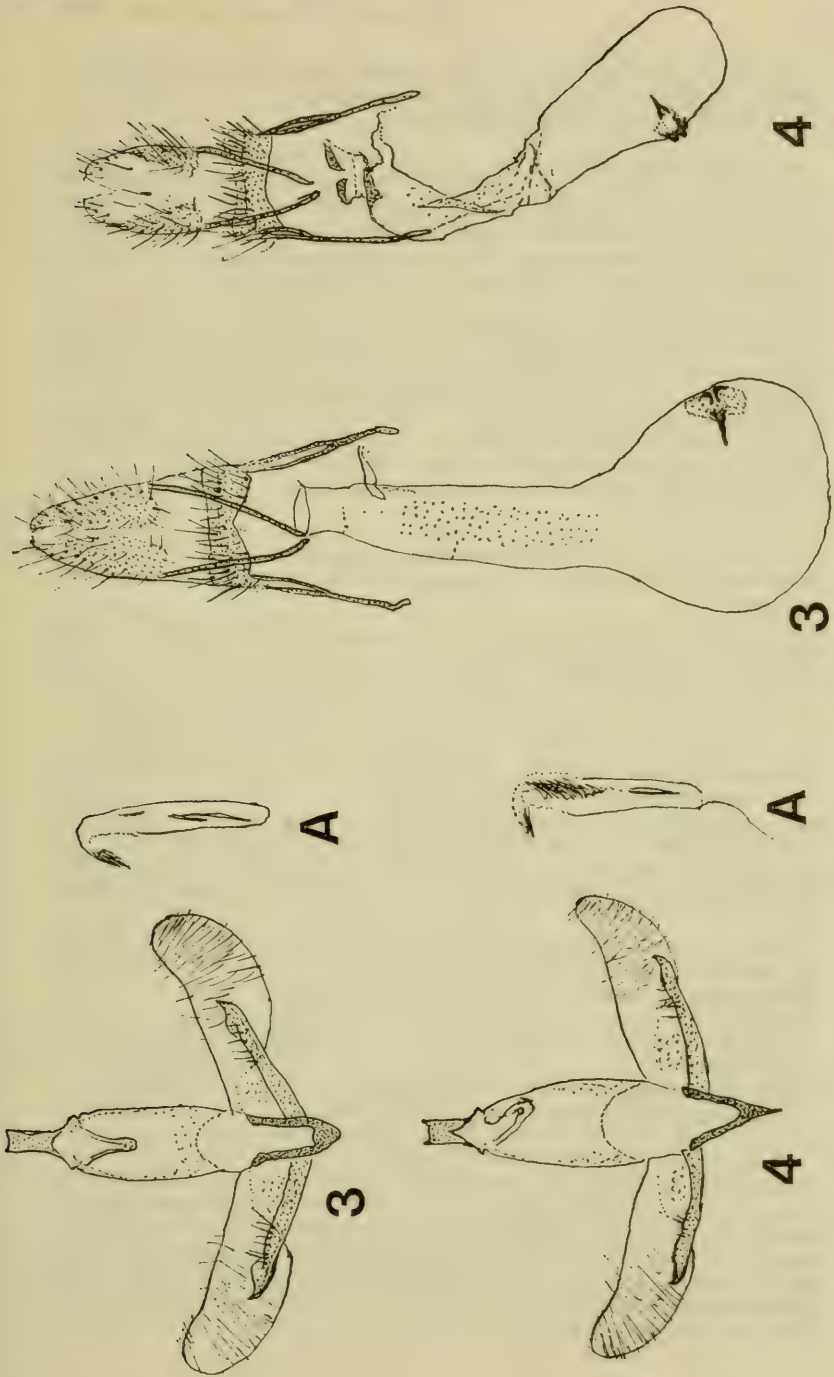
12: Genitalia of *Oegerostoma* spp.; ♂ on left (A=aedeagus); ♀ on right.
1: *O. piniariella* Z. 2: *O. friesei* Svensson

in some years, until April, and then again in July. The adults are on the wing in April and May (or even earlier) and again in August, though second generation moths seem less often to be met with.

In both species the egg is laid near the tip of a needle of Scots Pine and the larva, which appears yellow in the mine when it becomes full grown, mines towards the base. When full grown it leaves the mine and spins a slender cocoon between 3 or 4 leaves.

The genus *Oegerostoma* Staint.

Although the differences between the two species were described by Goddard they still cause confusion to many. Basically the pale species with dark stripes is *O. quadripuncta* and the dark species with pale fascias is *deauratella*. Both species are very variable. Apart from these general differences in wing pattern I can find no constant superficial character by which they can be separated. In both species the head, palpi and thorax are variously coloured dark fuscous and ochreous yellow. In both species the antennae are dark fuscous with pale yellow tips and some broad indistinct paler rings. The forewings are dark fuscous with a basal dot, a variable fascia at $\frac{1}{4}$, a broader central fascia, an irregular fascia



3-4 Genitalia of *Oegoconia* spp., ♂ on left (A=aedeagus); ♀ on right.
3: *O. quadripuncta* (Haw.). 4: *O. deauratella* (H.-S.)

at $\frac{3}{4}$ and an indistinct spot in the terminal cilia, ochreous yellow — sometimes suffused fuscous. Hindwings pale grey.

The genitalia show constant differences:

O. quadripuncta (Haw.) The ♂ has saccus bluntly triangular, the sacculus has a bulbous projection near the tip (this character can be examined without dissection on specimens which have the valves slightly apart) and the cornuti in the aedeagus form a patch of slender spines. The ♀ genitalia have a weak ostium, a straight and simple broad ductus and bursa, the signum arises from a chitinized plate.

O. deauratella (H.-S.) The ♂ has the saccus extended to a point, the sacculus is reasonably uniform in width, without a projection near the apex, and the cornuti consist of a large patch of broad-based spines, together with a group of slender spines in the extruded vesica.

Differences in the life histories of the two species have not been detected. Their whitish larvae feed on decaying vegetable matter in May and June, pupating amongst the food material. The moths are on the wing in July and August, they come to light and are sometimes plentiful in hedgebottoms.

O. quadripuncta is not uncommon in the southern part of England, particularly in the South West, and has been recorded as far north as Lancashire.

O. deauratella is not uncommon in the South East of England, it is the commoner of the species in East Anglia and it extends in the West to Dorset.

A Supplement to 'Illustrated Papers on British Microlepidoptera'

Lampronia flavimitrella Hubn. wingspan 14-16 mm. Head ochreous yellow, forewings greyish brown, markings shining white. The ♀ has two fascias at $\frac{1}{3}$ and $\frac{2}{3}$ broader towards the dorsum, the outer one is sometimes interrupted, there is a small spot on the costa beyond it. In the ♂ the first fascia is reduced to a spot above the dorsum, the second to a spot on the dorsum and another on the costa, sometimes obsolete. Hindwings grey.

The ♂ may be distinguished from other British *Lampronia* spp. by the spot at $\frac{1}{3}$ not touching the dorsum, the ♀ by its two fascias. The only species of similar size with which confusion is likely is *capitella* Clerck.

The life history is not yet known, but it is thought to be associated with *Rubus* spp.

The adult flies during the day in sunshine in May and June.

The only British specimen was taken in Hampshire on 18th May 1974 at 7 a.m., abroad the species is widely distributed in Europe, from France to Russia and from Denmark to N. Italy.

Caloptilia rufipennella Hb. 11-12 mm. Antennae bright golden brown, obscurely ringed darker. Head, thorax and forewings chestnut brown, dorsal cilia dark grey, occasionally there are some spots tending to form lines along the wings. Tibiae of forelegs and middle legs dark brown with an ill defined whitish central band. Hindwings dark grey. The adults can be distinguished from *elongella/betulicola* by their smaller size, darker forewings and darker tibiae.

Larva green, head slightly paler. At first it mines a leaf of Sycamore then makes a sequence of three cones, each rolled downwards at the tip of a lobe. June–July. Pupa under a pale greenish membrane under a leaf in July.

The adult is on the wing August–May, hibernating in evergreens or other dense cover. It has been recorded from Eastern Britain, from Essex to Berwickshire. It is common and widespread on the continent.

Caloptilia robustella Jäckh 10–12 mm. Colouration and pattern similar to *C. alchimiella* Scop. except that the yellow triangular spot on the costa is not extended towards the termen, and its lower point is rounded off not reaching the dorsum. In *alchimiella* the yellow spot is extended along costa towards termen where it is less well defined, the lower point touches or almost touches the dorsum. The basal yellow spot on the dorsum is well defined in *alchimiella* but less so in *robustella*. Generally *robustella* is slightly smaller and the darker of the two species.

The larva feeds on Oak in July and again in September and October giving imagines in May and August. The larva has yet to be distinguished from that of *alchimiella*.

robustella is widespread and common in South East England, but becomes scarcer as one moves northwards and westwards; it has not been recorded from Scotland or Ireland.

Phyllonorycter dubitella (H.-S.) (fig. 5) is a species very closely related to *P. salicicolella* Sirc.. The chief superficial difference is in the angle formed, or nearly formed, by the first costal and dorsal strigulae. It is acute in *dubitella* and the strigulae are strongly edged in the inside with black; in *salicicolella* the angle so formed is obtuse or a right angle.



The life history is similar to that of *salicicolella* except that *dubitella* appears to be confined to *S. caprea*.

The species has been recorded locally from the South and South East of England as far north as Worcestershire and Huntingdonshire.

P. strigulatella (L. & Z.) (fig. 6) 8–10 mm. Face white, head and thorax fuscous; antennae fuscous except at the base where they are white, especially on the anterior side, and the tip is whitish. Tegulae white-edged inwardly. Forewings orange-brown, but fuscous around margin and markings, four costal and three dorsal strigulae white, a white basal streak reaching



as far as first costal strigula; a strong black apical dot. Hindwings grey.

Larva July and September – October on *Alnus incana*, often several in one leaf, producing imagines in May and August.

This is not such a recent addition to our list, it was found by Waters in Berkshire in 1927 and has since been found in Hampshire, in counties bordering the Severn, in Derbyshire and Argyll. It is likely to be found in further localities where the foodplant occurs. Abroad it is widespread in north eastern Europe.

P. platanoidella (Joannis) (fig. 7) is now accredited with specific status; it was formerly regarded as a form of *sylvella* Haw. and the distinctiveness of the species is not unanimously accepted. The imagines can only be separated by the shape of the first chevron. In *platanoidella* this is bent or obtuse-angled whereas in *sylvella* it forms a right angle and is sometimes constricted in the middle. There is however considerable variation and in some specimens the differences are scarcely perceptible.

The life history is the same as that of *sylvella* except that the larva feeds on Norway Maple. It has been recorded from South and South East England.

P. sagitella Bjerck. (fig. 8) 7-8 mm. Face white, head white with some fuscous hairs at the front, antennae annulated fuscous and whitish. Thorax white powdered with fuscous. Forewings white mixed fuscous, but if regarded as having dark ground colour there are five ill-defined costal strigulae and three dorsal; an indistinct blackish apical streak; hindwings

grey. The forewing is similar to that of *comparella* but can always be distinguished by the five, instead of four, costal strigulae the difference being most clear towards the apex.

Larva on Aspen June-July and August-October, giving imagines in April-May and July-August.

Apparently scarce and local in western Britain, it has only been recorded from the Gloucestershire area and north Wales. Widespread in Europe. The species appears able to exist at very low density.

Chambersia augustella (Hb.) comprises a complex of three species of which it seems two occur in Britain. Herr Jäckh is researching into this group and a publication is awaited. It would be helpful if all specimens with reliable data could have their identity verified at the British Museum (Nat. Hist.), our commonest species is probably not *augustella*. Roughly speaking it is blackish with light markings whereas *augustella* is pale yellow with black fasciae.

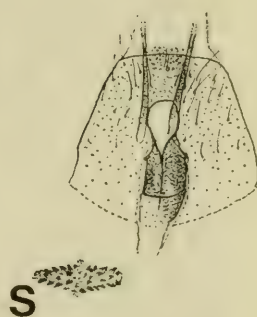
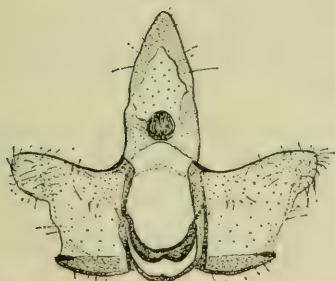
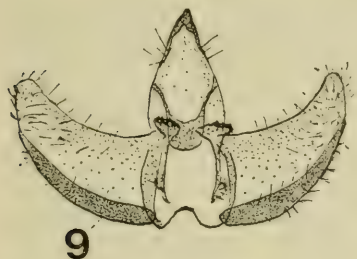
Bisigna procerella (D. & S.) 11-13 mm. Head dark bronzy fuscous, palpi long, orange with the terminal joint brown at the tip. Antennae ringed black and white. Thorax and abdomen dark fuscous with some orange scales on the thorax; tegulae orange. Forewings bright orange, there is a short oblique fascia from base of costa to dorsum, silver-metallic edged black. Further fascias of same colour at $\frac{1}{4}$ and $\frac{1}{2}$ from dorsum not quite reaching costa joined together by a longitudinal subcostal streak; dark fuscous spots on costa at $\frac{3}{5}$ and near the termen, both more or less connected to a dark tornal spot; cilia orange. Hindwings dark grey.

According to continental authors the larva is olive-grey with a black head, feeding on lichens and mosses on trunks September-May.

There are no further records since the original three specimens taken in two woods in Kent in mid-July 1976. One can only speculate whether these were primary migrants or locally bred. Species in this group are seldom seen other than in exceptional weather or else flying in early morning sunshine when few entomologists are about. Further diligent search might be worthwhile.



Pseudatemelia josephinae Toll 17-20 mm. Head ochreous yellow, palpi dark fuscous above, paler beneath. Antennae $\frac{2}{3}$ pale fuscous very faintly ringed. Thorax shining fuscous straw, a spot in fold at $\frac{1}{3}$ and another in disc just above it and inside it, beyond these a large spot in disc, dark fuscous; cilia slightly paler than forewing. Tibiae of forelegs dark fuscous. Hindwings greyish fuscous.



9-11: Genitalia of *Pseudatemelia* spp.; ♂ on left (A=aedeagus); ♀ on right.
9: *P. josephinae* Toll. 10: *P. flavifrontella* Hbn. 11: *P. subochreella* Doub.

The species can most readily be separated from *P. flavifrontella* Hb. by the colour of the abdomen which appears greyish in *josephinae* and yellow in *flavifrontella*; the forewings of *josephinae* are broad and less pointed and it is generally smaller. The genitalia are so distinct that reference to the figures (9-11) of these for the three species of this genus is sufficient. In male specimens these can easily be examined without dissection.

The life history has not yet been distinguished from that of *flavifrontella*, but the adults are on the wing in July, considerably later than *flavifrontella* although all three species of *Pseudatemelia* can be found on the same day.

Recorded locally from woodlands in the south of England and in Scotland.

Depressaria silesiaca Hein. 15-17 mm. Face shining whitish, head with rose hairs above; palpi with second joint clothed with a tuft of drooping scales white above, fuscous mixed rose beneath, terminal joint whitish speckled with fuscous, extreme tip pinkish white. Thorax and tegulae greyish white speckled with rose. Antennae dark fuscous obscurely ringed rosy white towards base. Forewings whitish grey irrorated rose especially towards base and with fuscous towards termen, a small blackish dot at base of costa, a line of black scales beneath costa at $\frac{1}{3}$, a spot at $\frac{1}{2}$ and another beyond in disc more or less connected to make a black streak, an ill-defined black line along fold, blackish suffusion along dorsum towards base and some black scales in terminal area including cilia. Hindwings pale grey, darker at apex. Abdomen grey, forelegs and middle legs dark pinkish fuscous, hind legs clothed above with ochreous whitish hairs.

The genitalia (fig. 12) are quite distinct and the males should allow determination without dissection.

Larva bright green with conspicuous stripes, head mottled, in a tube amongst leaves of yarrow (*Achillea millefolium*), in July. Adult August to April.

So far recorded only from the Eastern Central Highlands of Scotland.

Agonopterix bipunctosa Curtis 19-22 mm. Face, head, tegulae and abdomen pale buff; palpi pale buff but second joint blackish towards base on outside. Thorax pale buff with an indistinct darker central line, sometimes two small blackish spots at sides, almost beneath tegulae. Antennae and forelegs blackish fuscous. Forewings pale buff, a basal spot on costa, a distinct sub-basal dorsal spot, two distinct spots in middle of wing at $\frac{1}{3}$ and $\frac{5}{8}$, a sequence of spots around termen black; streak above dorsum fuscous with a few black scales, sometimes obsolete, veins powdered black and fuscous. Hindwings pale greyish buff.

Larva black, in rolled leaves of *Serratula tinctoria* and possibly sometimes on *Centaurea scabiosa* in June. Adults on wing in July.

Recorded in the south of England from Cornwall to Hants.

Since Meyrick *et alii* sunk this species as a synonym of *liturella* D. & S., it has been overlooked, but now that the life history is better known it may be found to be more widespread and even common where the foodplant occurs.

Superficially *bipunctosa* closely resembles *liturella* and *pallorella* but the latter species is on the wing much later in the year. *A. bipunctos* is best distinguished by the ground colour of the forewings, the distinct sub-basal spot, the powdering of scales on the veins and the absence of ferruginous colouring which occurs in *liturella*. The ♂ genitalia (fig. 13) are similar to *liturella* although the cuiller or sacculus extension, is longer and more

slender and outward curved, the valva is also less pointed and more clothed with hairs and the process between the uncus lobes is less pronounced. The ♀ genitalia are also very similar to *liturella* there being only slight differences in the shape of the ostium and signum.

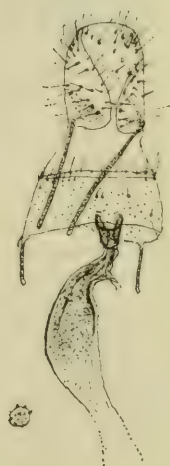
Agonopterix scopariella Hein. 20-22 mm. Face creamy white; head, thorax and tegulae brownish sometimes tinged reddish. A form occurs with thorax black. Antennae fuscous. Forewings costa straight, brown, reddish brown or straw, suffused with brown, more or less dotted black; two obliquely placed black dots in disc at $\frac{1}{3}$, a distinct creamy white dot in disc at $\frac{1}{2}$ and another beyond it sometimes edged black, a larger suffused dark spot above the latter; black dots around termen, sometimes obsolete. Hindwings grey, paler basally.

The full grown larva is green with darker dorsal and subdorsal lines, head and plate of 2 pale brownish but variable. In slight web on Broom from which it can be beaten out, June-July. Imago August-May.

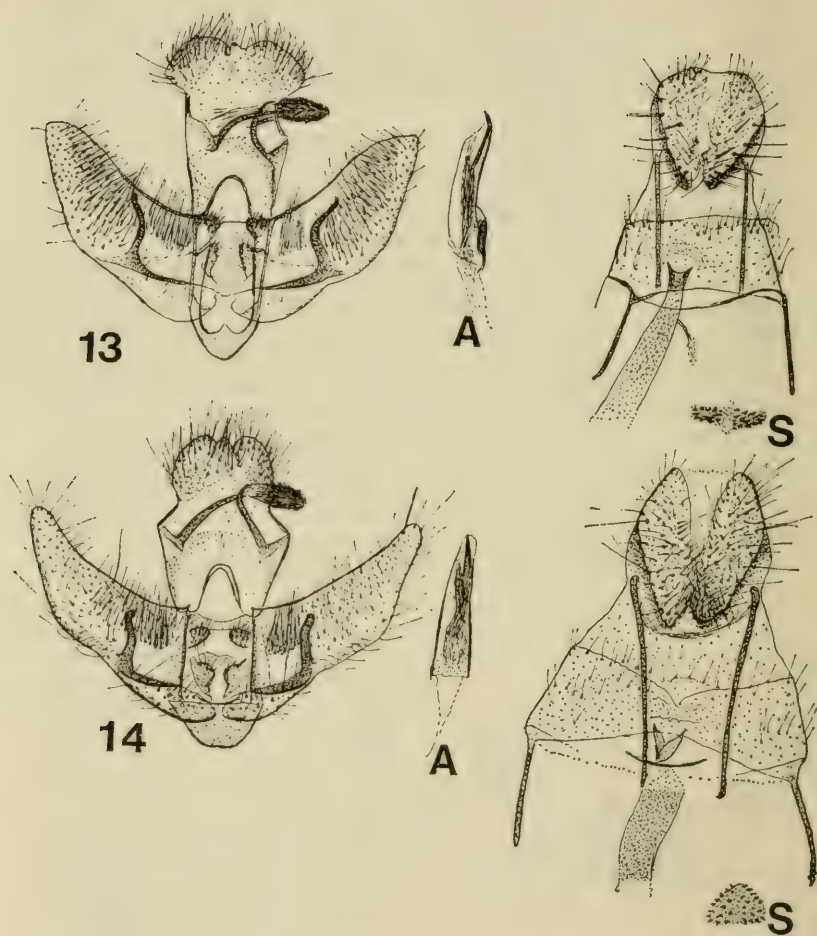
Appears to be widely distributed throughout the British Isles and sometimes common, but reliable records are still scanty.

The species was placed in the synonymy of *pulverella* Hb. by Meyrick *et alii* and so has been overlooked. It is of a very different colour and appearance from that species, its superficial resemblance to *subproppinquella* Stt. makes that the most likely species with which it may be confused, but its distinctive feature is the pair of creamy white dots on the forewing. The genitalia (figs. 15) are reasonably distinct, most noticeable being the shape of the cuiller in the male.

Agonopterix prostratella Const. 22-25 mm. Head, thorax and abdomen pale straw, antennae fuscous. Forewings with costa rather straight, pale straw, first discal spot black, distinct; second discal spot ill-defined or absent. There are some pale brown scales along veins towards termen and a row of blackish dots around the termen. Legs pale straw. The genitalia (figs. 14) are similar to those of *A. ulicetella* Stt. but in the ♂

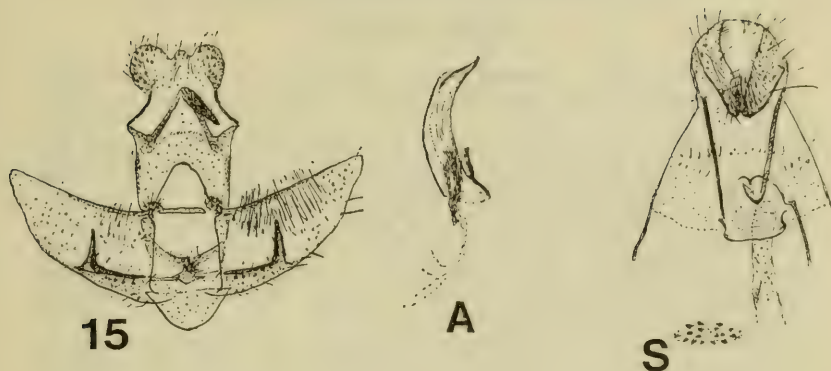


the cuiller is narrow throughout its length, the ♀ has a signum of rounded triangular shape.



12-15: Genitalia of *Depressaria* & *Agonopterix* spp., ♂ on left (A=aedeagus);
♀ on right (S=signum.)

12: *D. silesiaca* Heinr.; 13: *A. bipunctosa* Curtis; 14: *A. prostratella* Constant;
15: *A. scopariella* Hein.



Superficially the species is similar to other pale species: *pallorella* Zell., *bipuncta* Curtis & *liturella* D. & S., but the latter two are on the wing earlier in the year. It may be distinguished by the obsolescent second discal spot, the pale straw rather than dark forelegs and the straight costa.

According to continental authors the larva is deep green, sometimes reddish brown, especially posteriorly; warts black, distinct; head and plate black, anal plate horny, lightly marked with body colour. It is stated to feed between twigs of *Genista prostrata* in June & July. The adult is on the wing July to September. As *Genista prostrata* does not occur in Britain the larva presumably feeds also on a closely related plant.

First recorded by Fairclough who took a specimen in Ashdown Forest, Sussex, in 1957. A further specimen was taken at Studland, Dorset by myself in 1970 which remained wrongly identified until 1980. The ♀ dissected and figured by Pierce as *pallorella* is also this species, but the data of the specimen are not known.

Mompha subdivisella Bradley 12-13 mm. Head sordid white mixed greyish fuscous especially at sides and collar, face white. Thorax, tegulae and antennae brownish fuscous, with some scales tipped ochreous white. Forewings brownish fuscous mixed with greyish-barred scales mostly along dorsum and termen, some fuscous scales in fold, a narrow oblique whitish fascia at $\frac{3}{4}$ somewhat suffused brownish fuscous, some pale ferruginous-ochreous scales in dorsal half of disc and at middle of outer edge of fascia, a small tuft of raised fuscous scales at outer angle of fascia and dorsum, a fuscous terminal line, cilia greyish. Hindwings greyish fuscous.

Life history unknown. The species is known in Britain only from the type series from Merton, Norfolk, taken by Lord Walsingham in September 1894; it has been recorded from Central Europe. It is closely related to *divisella* H.-S. but is a little larger and less well marked than the species. As most members of this genus feed on *Epilobium* careful search might reveal further data for this species.

CURRENT LITERATURE

BOOK REVIEWS

A Revision of the Armadini (Lep., Noctuidae) by E. P. Wiltshire. Entomograph 2 1979, 79pp. including 20 text-figs. + 198 pl. figs. Price D.Kr. 120.

The author and publishers are to be congratulated on producing this detailed revision, which greatly increases our knowledge of this interesting tribe of Noctuidae. The result of twenty years' study, this extensive treatment follows earlier papers by the author on these moths. Ten genera and forty-two species are dealt with. The author mentions the dearth of up-to-date publications in the Noctuidae, in which subfamily delineations are often imprecise and the immense numbers of species involved add to the difficulties of the taxonomist.

The unique Wiltshire collection on which the present revision is primarily based has recently been presented to the British Museum (Natural History). It is the result of extensive collecting by the author throughout the Middle East. The author has also made use of material from many other sources in collections abroad during the preparation of his revision.

Printed in hardback covers on good quality paper, the information is clearly presented. Reproduction of the figures is good and extensive keys and distribution maps are included.

I share with the author the hope that this work will inspire further collection and study of these insects.

A. H. HAYES

Sepsidae. Diptera Cyclorrhapha, Acalyptrata. Handbooks for the Identification of British Insects. Vol. X. Part 5(c). By A. C. Pont. Royal Entomological Society of London 1979 35 pp. £2.20. (£1.65 to Fellows).

This work not only provides an excellent key to this neglected group but also incorporates the results of a much needed complete taxonomic revision of the British species. Nomenclatural changes since the recent Diptera check list (by the same author) are summarised by the inclusion of a revised check list; *Sepsis nigripes* Mg. becomes a synonym of *fulgens* Mg. and *Meroplius minutus* Wied. is substituted for *M. stercorarius* R-D.

The keys are arranged so that a variety of characters can be checked to confirm the identity of a species, thus overcoming the difficulties in previous keys resulting from infraspecific variation. Diagnostic features are well illustrated by 45 textual figures; 123 figures of leg structure and genitalia are arranged in plates at the end of the text.

A good account of larval and adult habits and biology is given in the introduction. Because all the major British collections have been studied, a good idea of the distribution and frequency of most species has been achieved. Most appear frequent and widespread, probably because of their association with decomposing materials which are available everywhere; a few species, however, have apparently restricted distributions. The Channel Islands distribution, usually omitted from Royal Entomological Society Handbooks, is also included. Details are given of a Recording Scheme currently operating for British Sepsidae.

P. J. CHANDLER

AN ESTIMATE OF THE BRITISH POPULATION OF *APATURA IRIS* (LINNAEUS). (LEPIDOPTERA: NYMPHALIDAE)

by T. S. ROBERTSON
(43 Locks Ride, Ascot, Berks)

INTRODUCTION

Changes in the habitats of our British butterflies have been drastic in the past 25 years, but until the point of no return is reached it is difficult to assess their adverse effects on populations of any one species. The large blue (*Maculinea arion* (Linnaeus)) declined from being abundant along the coast from Hartland (Devon) to Bude (Cornwall) to a situation 12 years later such that the Nature Conservancy considered the species extinct in Britain (Ratcliffe, 1979). The causes were changes in the habitat, as documented by a number of authors (see for example Muggleton and Benham, 1975). The chequered skipper (*Carterocephalus palaemon*) (Pallas)) underwent a similar decline to apparent extinction in England at about the same time (Goodden, 1978; Ratcliffe, 1979). Writing nearly 25 years ago, Heslop considered that the purple emperor (*Apatura iris* (Linnaeus)) would at best be confined to a few wholly isolated communities by 1975 (Heslop, Hyde and Stockley, 1964), which suggests that its fate could be similar to that of the large blue and chequered skipper. It seems now to be appropriate to look at the status of this species despite the very real difficulties in making any real satisfactory estimate of the numbers of a butterfly that is so elusive.

METHODS

Of the various stages in the life-history, the egg and early-instar larva before hibernation, and the later larva in mid-May, were selected as being those most suitable for estimating numbers. Based on observations made in Surrey in the middle nineteen-sixties, estimates were made of the populations in August-September and again in May, in an area of 1 km². Estimates by Heslop (Heslop, Hyde and Stockley, 1964) were used to derive a provisional life-table for the butterfly.

This was followed by an estimate of the total area of deciduous or mixed woodland in the known distribution area of the butterfly since 1960, using a distribution map provided by J. Heath of the Biological Records Centre, updated from that of Heath (1973), together with a study of the relevant one-inch Ordnance Survey sheets.

Some published papers were used in conjunction with own observations to try to assess the decline in area of suitable woodland breeding habitat.

All the methods used are liable to severe criticism, but in the absence of any alternative at present, they were used to provide at least a first approximation to the status of the purple emperor.

RESULTS

1. Field Observations and Estimates of Population Density

Experience over several years indicated that if 100 suitable willow trees (*Salix*) (Heslop, Hyde and Stockley, 1964; Cribb, 1963) are searched by a group of competent workers about 5 larvae will be found in an average season. Some larvae are almost certainly overlooked, and there will be at least as many that are out of reach, so the 100 willows probably support about 15 larvae. It was estimated that there were about 150 'suitable willows' in the one-kilometre square studied, but since only one-quarter of the square was wooded this would provide an estimate of 90 larvae/km² woodland. This can be rounded up to 100 larvae/km².

Counts of eggs and young larvae indicated that there were about 50 of these for every larva found in May, but this would indicate in turn that each adult female would have to lay at least 100 eggs, and probably many more. Although large numbers of eggs have been recorded from captive females (Cribb, 1965), this seems excessive.

Heslop (Heslop, Hyde and Stockley, 1964) postulated a situation in which a population of 1000 adult butterflies in an area of about 300-400 acres (which is about 1.5 km²) laid 60 fertile eggs per female and there were 200 female butterflies. The figure of 1000 adult butterflies depended on the assumption that only 200 would be females, but there seems no justification for assuming other than a 1:1 sex ratio. Taking Heslop's starting point of 200 females to maintain his colony, but assuming a 1:1 sex ratio, his figures would lead to an estimate of 400 adult butterflies, and 500 larvae in May. This was in 1.5 km², so the density of May larvae would be 334/km², or over three times my estimate. To try to compromise, I have doubled my original estimate for May larvae, reduced my estimate of the autumn population by a factor of 2.5, and made other adjustments to Heslop's and my estimates to provide an estimate of the numbers in successive stages that would correspond to a fertility of 50 eggs laid per female in the field. This gives rise to Table 1.

Table 1. *Numbers and mortality in different stages in the life-history of Apatura iris in 1 km² woodland in an average year.*

Numbers/km ²	Percentage mortality In this stage		Cumulative
Eggs laid	2500	20	20
Eggs hatched	2000	75	20
Larvae entering hibernation	500	50	80
Larvae completing hibernation	250	20	90
Larvae in mid-May	200	10	92.8
Larvae pupating	180	11	93.6
Adults emerging	160	37	96
Females laying average 50 eggs	50		
Eggs laid	2500		

2. *The area of woodland available to A. iris in its known distribution*

According to the revised map received from John Heath, there were 40 ten-kilometre National Grid squares (each comprising 100 km²) where *A. iris* has been recorded since 1960. The distribution falls into a main stronghold around the Surrey-Sussex border, extending into the less favourable birch-pine forest to the west and beech forest on the South and North Downs; an area in the New Forest and southern Wiltshire; a tongue extending up northwards to northern Hampshire and Berkshire; and some more or less isolated areas in south-west Sussex, East Sussex, Oxfordshire, Middlesex, Nottinghamshire and Norfolk. I have suggested from knowledge of some of these areas that in the nineteen-sixties about 20% of the woodland in the best area was favourable for *A. iris*, 15% in the lesser areas, and rather more in the extremely isolated areas (where the total woodland is in any case very small). This gives rise to Table 2.

Table 2. *The area of suitable woodland (in km²) in the known distribution of A. iris*

Region	10-km squares recorded No.	Area (km ²)	Area of mixed and deciduous woodland	Area estimated as suitable for <i>A. iris</i>
Surrey-Sussex Border	16	1600	265.8	50
New Forest & S. Wilts	8	800	175.5	25
N. Hants-Berks	7	700	88.8	10
S.W. Sussex	2	200	32.4	5
Oxon-Bucks Border	3	300	13.3	10
E. Sussex	1	100	14.3	5
Midx-Herts Border	1	100	7.3	3
Notts	1	100	2.3	1
Norfolk	1	100	2.1	1
TOTAL	40	4000	601.8	110

This provides an estimated 110 km² of breeding woodland for *A. iris*. Allowing for a further 15 km² where the butterfly still bred but was not recorded in the relevant period, an estimate of 125 km² is arrived at.

3. *The estimate of numbers for the whole country*

If we accept the estimate of 160 butterflies/km² and 125 km² woodland we arrive at a population of 20,000 adult butterflies, providing about 250,000 eggs that hatch, about 60,000 larvae entering hibernation, and about 30,000 larvae on the sallows in mid-May.

The estimate is based on some highly questionable approximations and assumptions, but allowing for an error by a factor of 10 either way, it seems reasonable to accept that the adult population for the whole country lies between 2,000 and 200,000. The difference of 100-fold could in any case occur in the ordinary fluctuations over a number of years. The lower limit seems critically close to the level at which the species could disappear from its more remote breeding areas, and since this would appear to have happened anyway this suggests that the estimate is of the right order. The upper limit seems to me to be more questionable, and the numbers at the peak of a population rise might well be considerably higher than 200,000, perhaps as high as a million if the butterfly were to extend its range temporarily, re-colonising old areas and occurring in very high numbers in its strongholds, as Stockley described for a Sussex wood in 1952 (Heslop, Hyde and Stockley, 1964).

4. *The Decline in Area of Suitable Habitats*

Although the devastation caused in the past 25 years to the deciduous woodland that provides habitats for *A. iris* has been all too apparent to anyone working in the field, I could find no simple way of quantifying it.

A useful publication was one by Peterken and Harding (1975), who compared the effects on nature conservation of changes in 3 wooded areas of eastern England. They were interested especially in plants, and found that if plant species were good colonisers there was a reduction of conservation value of 40% in the Rockingham Forest area (a former habitat of *A. iris*) from 1946 to 1973. The decline was 29.4% in central Lincolnshire (also a former habitat) and 20.7% in the more isolated and scattered woods of West Cambridgeshire. Peterken (1976) warned against extending these results to other areas.

Locke (1970) estimated that in the 28 years from about 1948 to 1966 about 200,000 acres of private woodland in England, Scotland and Wales (out of a total of 865,000) had been felled and planted with conifers. At the same time, about 300,000 acres of woodland (mainly 'unproductive') passed from private to Forestry Commission ownership, and no doubt some or much of this would become unsuitable for *A. iris* as it was brought into a productive state.

Practically all of the distribution of *A. iris* lies in the 'East England' and 'South-East England and New Forest' conservancy areas of the Forestry Commission, and since about 70% of the woods in the former and 85% of the latter were in private ownership in 1965 (Locke, 1970), the fate of private woodlands reflects the fate of *A. iris* habitats.

Personal observations on the destruction wrought by the Forestry Commission in such well-known habitats for *A. iris* as Salcey Forest, Bernwood Forest and the Surrey-Sussex borders, as well as in less well-known areas, indicate that the damage is more than that covered by conversion from deciduous to coniferous woodland.

My rough estimate, based on such data as are extractable and my own observations, is that in the main breeding areas 25% of the suitable territory in 1948 had been rendered unsuitable by 1958, a further 25% by 1968 and possibly another 25% by 1978, indicating a reduction by three-quarters in the course of 30 years. Peterken and Harding (1974) considered that the decline in conservation value of Rockingham Forest was likely to continue, but also considered (1976) that if agricultural intensification proceeds to the point where almost all woods have been cleared from the agricultural zones, the forest policy will save some of the conservation values in zones that are more utilised for forestry. It is thus possible that some of the damage that has been done could be offset by some advantages in the future.

DISCUSSION

My estimates are so riddled with guesswork and unscientific assumptions that I have hesitated to submit them for publication. Nevertheless, had something similar been attempted for the chequered skipper butterfly it might have highlighted the problems and possibly have led to saving that species from extinction in England. With this in mind, I present my attempts, in the hope that they may lead to some better estimates before the opportunity might be lost for ever. The fields in which better estimates might be sought by future workers include the following:

- (a) the numbers of larvae per sq. km of breeding habitat
- (b) the proportion of the total distribution area that is suitable for *A. iris* to breed in
- (c) the rate of destruction (and possibly accrual) of breeding habitats
- (d) the causes of and extent of mortality in the successive stages of the life-history (see, for example, the monograph by Friedrich (1977))
- (e) estimates in the fluctuation in numbers from year to year (see for example Pollard, (1979)).

Regarding the recent distribution and numbers of *A. iris*, Heslop's gloomy forecast referred to in my introduction does not seem to have been fulfilled, and I understand from reports from friends that 1976 was a good year for the species. A revised distribution map is due for publication in 1981, to include the 1976 records (Heath, pers. com.), and we may hope to see a more complete coverage of some of the former localities with recent records.

ACKNOWLEDGMENTS

A considerable number of people helped directly or gave advice, and I mention especially in this respect P. W. Cribb, C. J. Hamilton, B. Harries, J. Heath, J. Mathias, G. F. Peterken, K. J. Wilmott and L. D. Young for the assistance they gave me in various ways.

SUMMARY

Some provisional tentative estimates are made for the numbers of purple emperor butterflies (*Apatura iris* (Linnaeus)) and immature stages in England in the middle nineteen-sixties. These are based on field observations and on estimates of the known breeding area available to the butterfly. It is estimated that there were of the order of 20,000 butterflies in an average year, laying about 250,000 eggs in 125 square kilometres

of breeding habitat. The area of habitat is estimated to have fallen by about 50% in the period from 1948 to 1968, and by a further 25% of the 1948 area by 1978.

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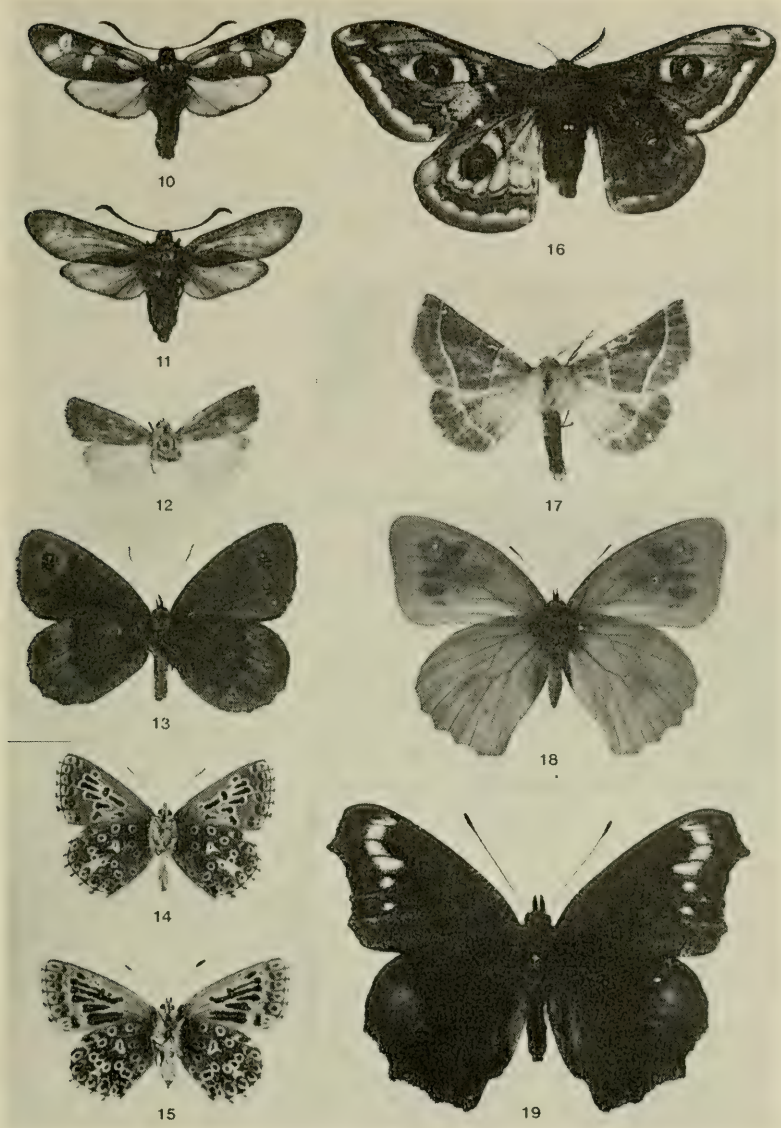
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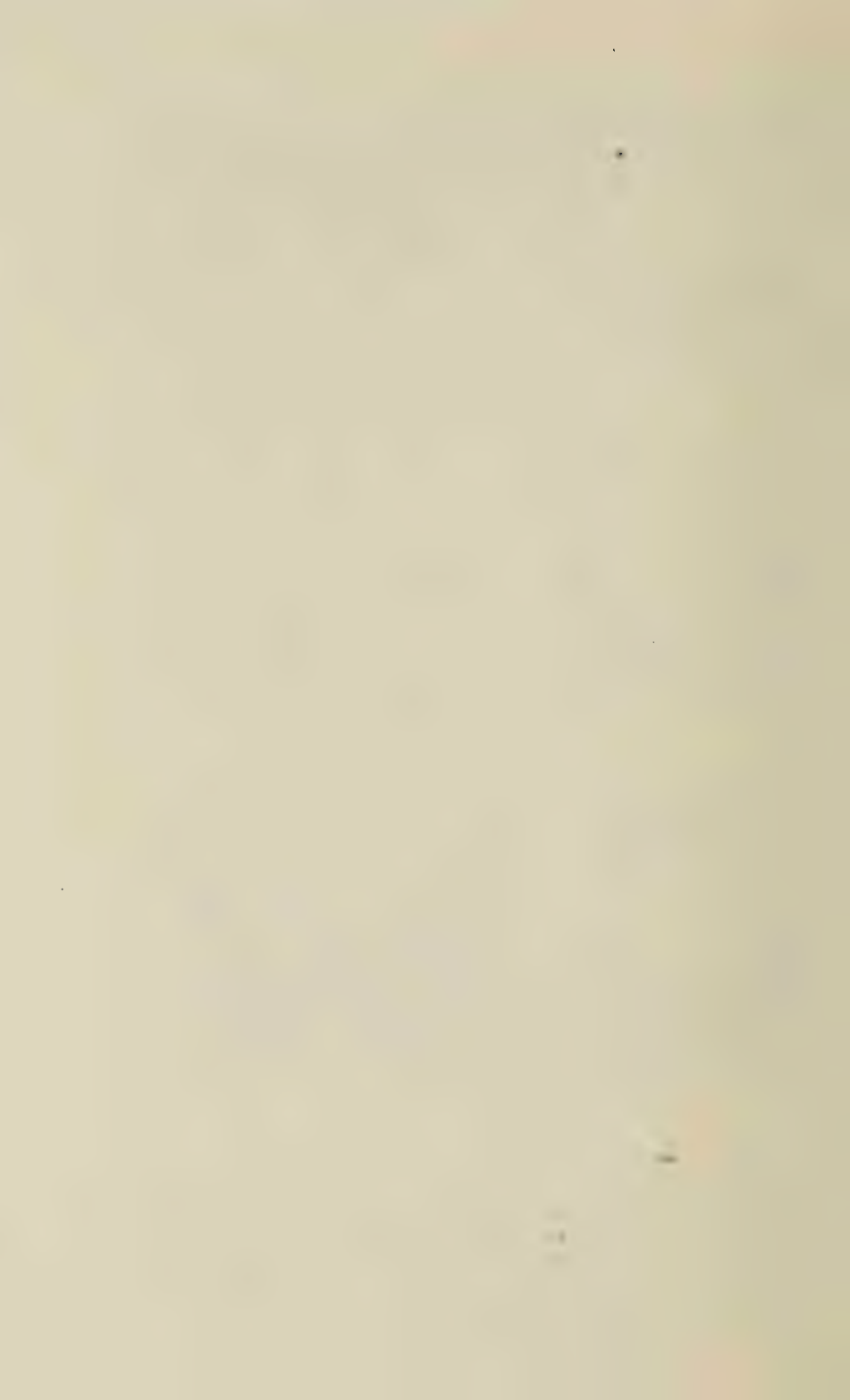
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ANNUAL EXHIBITION, 1979

PLATE IX

Fig. 10. *Zygaena trifolii decreta* Verity ab. (W. G. Tremewan). 11. *Z. filipendulae anglicola* (Trem.) ab. *aurantia* Tutt (W. G. Tremewan). 12. *Athetis hospes* (Esp.) (J. Porter). 13. *Erebia aethiops* (Esp.) bilateral gynandromorph (R. Watson). 14. *Lysandra bellargus* (Rott.) ab. (L. D. Young). 15. *Lysandra coridon* (Poda) ab. *antidigitata* B. & L. (R. Revels). 16. *Saturnia pavonia* (L.) gynandromorph (R. Arnold). 17. *Crocallis elinguaris* (L.) ab. (A. R. Cronin). 18. *Maniola jurtina* (L.) albino ♀ (J. M. Chalmers-Hunt). 19. *Inachis io* (L.) ab. *belisaria* Ob. (A. D. M. Russwurm & H. G. M. Middleton).



LARVAE OF THE BRITISH LEPIDOPTERA NOT FIGURED

BY BUCKLER

PART XI

(with Plates X-XIII)

Compiled and illustrated by G. M. HAGGETT

Mythimna loreyi (Dup.) The Cosmopolitan

This Wainscot has a long history as a casual vagrant to Britain, past records relating to but a handful of moths over the years from the west country in the autumn. 1975 saw unprecedented numbers from both southwest England and Ireland in September and these included a number of females. But from those females kept for eggs only Dr. Alan Myers was successful in actually obtaining fertile eggs. Dr. Myers found the captive females very slow in laying and he was unable to secure a second generation, but from the original moth he was able to rear enough offspring to conduct an experiment on the effect of different temperatures on the pupa (*Ent. Gaz.* 28: 75). It was from these larvae that Dr. Myers generously sent me the six examples that are illustrated and described in this paper.

Description of last instar larva

Length 32 mm. Body, cylindrical with scant taper at either end, the intersegmental divisions slight, the rings flattened along the dorsum. General colour, ochreous-grey, heavily reticulated in fine black and shaded darker along the centre dorsum and at ring divisions. A heavily marked dusky dorsal stripe composed of coarse chain loops joined at the ring divisions. Subdorsals, finely etched in black wriggling lines that become thickened into black streaks on all abdominal rings, the streaks running about half the width of each ring; on the thorax the subdorsals appear as more continuous lines of speckled black. Adjacent to the subdorsals is a continuous fine white line finely edged below by a darker border and which runs the full length of the body. There follows a broader cream or straw coloured band and next a still wider dark grey band. The spiracular band that follows is broad, very conspicuous, and mottled stone or ochreous. Spiracles of abdominal rings 4-6 are placed just inside this band, all others along its upper edge. The spiracular band runs the full length of the body and down the side of the anal claspers. The ventral surface is greyish.

Head, rounded, flat in front, olive ochreous, the lobes marked by a bold dark brown curved stripe, and there is another weaker stripe at the side. There is a dark reticulation all over the head darkening below to the blackish mouthparts. Prothoracic plate broadly semicircular, grey-brown, reticulated, crossed by well marked white dorsal and subdorsal lines. Anal plate, pale grey, heavily reticulated in darker pattern, crossed by weak pale subdorsals. True legs, pale brown; prolegs, weak grey with shining darker grey plate. Spiracles, ochreous ringed in black and oval. Only the sparest of short fine hairs visible under low magnification.

This larva has the longer finely etched black subdorsal streaks that are familiar in *M. comma* but its body is more slender than that insect. This species shares the pinkish grey body hue of *M. putrescens* and would doubtless be passed over for that larva, but all the examples sent to me

had the black subdorsal streaks better defined and more boldly marked than in *putrescens*. This larva can be similar to some forms of *M. unipuncta* but again is rather less obese than that insect.

Plate X figs. 1-3: all last instar reared on *Dactylis* from Fountainstown, Co. Cork female, Ireland, taken by A. Myers. Drawn 13.x.1975.

Luperina nickerlii Freyer *leechi* Goater, Leech's Sandhill Rustic.

The discovery of this fine Cornish subspecies of *nickerlii* was recorded by Goater *Ent. Gaz.*, 27, 141. From moths taken in 1975. Mr. Goater sent me eggs which hatched in mid September. Larvae were given the same treatment as I had some years before given to *L. nickerlii knilli* and I met with similar success in rearing the present insect. The newly hatched larvae attacked *Poa annua* stems in a variety of ways, boring into leaf axils, in groups between leaves pressed together and in groups in the flower heads. Those in stems ate out the fleshy core and bored their ways down to the rootstock. Several occupied one stem. The first moult was passed in late October and the larvae then tunneled into the solid blanched lower stem of thicker stems. They came out of hibernation at the end of February and moulted a month later, after which they began to construct retreats in the soil. They accepted *Poa trivialis* in April and June I fed them up on *Dactylis glomerata*. In May I noted that whereas the majority of larvae lived at the roots in their tunnels some still bored up into the lower blanched stems whence they could be plucked in the same way that larvae of *Photodes morrisii* (Dale) and *Mesapamea secalis* (L.) can be collected. By 13 June some larvae had passed their last moult, and most pupae had hardened by 21 July. I noted that the larval tunnel was very flimsy, being no more than frail silken threads loosely holding together particles of frass, soil and rootlets. These tunnels led up into the grass root crown. Larvae were easy to extricate although they would retreat backwards quickly enough. The moths came out in August. Later that same year (1976) I received eggs from Messrs. Goater and Skinner, these being from the cross Cornish *leechi* × North Wales *gueneei*; the eggs proved fertile and larvae followed the familiar life history feeding on *Poa*, and produced the hybrid moths in September 1977.

Since my earlier discussion of *L. nickerlii* (*Proc. Brit. Ent. Nat. Hist. Soc.*, 2, (1968) 65) Mr. H. Michaelis has reviewed the history and status of *gueneei* in Britain *Ent. Rec.* 89, 183 (1977) where he points out the Bohemian race of *nickerlii nickerlii* occupies a very different habitat from that held by *gueneei* and *leechi* in Britain. And it seems the terrain in Ireland frequented by *knilli* is yet different again. Goater and Skinner found *gueneei* to be numerous in isolated colonies in Anglesey and in the original North Wales coastal location in 1976.

I am pleased to acknowledge my indebtedness to Messrs. Goater and Skinner in supplying me with eggs of these subspecies. With experience of rearing from the egg the early stages of *gueneei*, *knilli* and *leechi* I can record my opinion that *knilli* differs significantly from the other two, and that they themselves so similar are as larvae inseparable from *testacea*. These are the more constant distinctions: -

Larvae of testacea, leechi, gueneei

weak, poorly developed prothoracic plate, the chitinated band on ring 11 so weak as to be scarcely discernible.

Larva of knilli

broad well developed prothoracic plate, the chitinised band on ring 11 dark grey and heavy with a further broken band on ring 10.

Pupa of testacea, leechi, gueneei

cuticle matt, dulled, ochreous brown.

Pupa of knilli

cuticle shining, glossy chestnut brown.

Larval tube of testacea, leechi gueneei

slight and flimsy.

Larval tube of knilli

very tough and so strongly woven as to be destroyed only with great difficulty.

It is my belief that *knilli* may prove to be of separate — species — status, as De Worms *Ent. Gaz.* 29, 21 (1978) has already anticipated.

Description of last instar larva of NICKERLII LEECHI

Length 24 mm. Of the same thick squat shape as *knilli*, with sharp taper at both ends, swollen fleshy rings the narrowest and smallest of which are the first and second abdominal. Each ring as broad as long. Skin, tough, waxy and shining, the body with much transverse folding and quilting at the sides. Colour, a dusky olive cream, inclined to yellowish brown at the extremities, with a suggestion of pink flush on the thorax and again on the last three rings, greenish on the early abdominals. The dorsal vessel shows clearly through the skin. No hairs visible to the naked eye. There is little pigmentation, the prothoracic plate and anal plate being a very weakly coloured pale honey, the prothoracic being scarcely discernible, the anal however is better differentiated as a double rimmed structure placed high upon its ring, but it is still only faintly coloured. The head is large, globular, honey coloured, stained reddish low down, and it is furnished with a pair of enormous reddish black mandibles with four coarse teeth each. Spiracles, oval, blackish-rimmed, with dark brown centres, placed rather forward of centre on their ring; true legs, small, weakly chitinised and fleshy with one strong claw; prolegs, tiny with the simplest set of black crochets; anal claspers, large and well equipped with strong, black crochets.

Plate XI figs. 10-11, all last instar, reared on *Poa annua*, from female taken by B. Goater on the Lizard, Cornwall. Drawn 26.vi.1976.

Amphipoea fucosa (Freyer) *paludis* (Tutt) the Saltern Ear, and *Amphipoea lucens* (Freyer) the Large Ear.

Life is yet known of the life histories of the four insects accorded separate — if sibling — species status. Buckler's account of finding larvae *Larvae of Brit. Butterflies and Moths*, 48-50, Plate 52 figs. 2 (1891) in June 1878 and which he called *nictitans*, the old name used at that time for all four insects, relates to *paludis*, and this remains the only recorded instance of larvae of any of the group being found wild. Yet this account also refers to larvae sent to Buckler in 1862 in August, a date much too late I would have thought, although the inference is that Buckler had received another of this group and that he reared *nictitans* from it. On 23 July 1979 I was digging out Couch grass in neglected land in Norfolk when a larva seemingly of this group fell from the grass roots, thinking I had at last found *oculea* I reared this larva on Couch grass roots, only to obtain a diminutive *micacea* moth, its larva being

totally without the heavy dusted maroon normally typical of that larva. In the National Collection of British Lepidoptera (formerly R.C.K. Coll.) there is a blown larval skin labelled *crinanensis* found in Iris. I have long sought larvae of this group, spending much time digging in suitable terrain at the roots of all manner of potential foodplants, and I have searched for larvae of other genera in the stems and roots of aquatic and marginal plants in early summer, not once have I encountered a larva of any of this group, but then I never examined grasses. My experience in rearing *paludis* and *lucens* confirms Buckler's field discoveries and suggests that no matter in what terrain the moths may occur the larvae of all four insects would be better be sought at the roots and rootcrowns of grasses.

The distribution of these four insects in Britain is very uncertain, published records including as they must identification not always based on genitalia study, which itself is by no means as clearcut as one might hope. All four are recorded from England, Scotland and Wales, with only *paludis* so far absent from Ireland.

There are records of all four insects occurring on the same ground, for example on Lesser Skye and at Newtonmore, Invernesshire, while other localities may produce but one for example *lucens* only from Orkneys and Colonsay, or *oculea* only from Mull. In England *crinanensis* has, with sole exception of Devon, been reported only from the north, and from the Scilly Isles I can find reference only to *oculea*. From published records there seems to be no justification for the belief that *crinanensis* and *lucens* could be the northern counterparts of *oculea* and *paludis*, and so no reason why all four should not co-exist in some parts of their extensive territory as long as their separate breeding status is accepted.

We badly need the evidence of the early stages to corroborate or challenge our currently held concept of these insects which is based entirely on the form of genitalia of the moths. The larvae discussed in this paper — *paludis* and *lucens* — are indeed so very similar in structure, pattern and habitats that anyone who argued them to be the same species would have substance in his case.

Captive moths are unfortunately very reluctant to lay eggs in captivity, the two insects described here having laid between tightly adpressed grass blades. But once eggs were obtained they proved very easy to rear. Neither showed interest in leaves or stems of dock or Iris, instead they followed a mode of life shared by *Luperina* and *Apamea* namely to feed internally only during the early instars. The eggs hatch in late April or May and the tiny larvae feeding on *Poa annua* may at this stage eat either the leaf cuticle, bore inside a stem, or live together in the flower head. Later they eat out the core of larger grass stems. After the second moult they move to the roots where they construct silken retreats. Older larvae spin closely woven silken tubes, but those of *lucens* lived freely and openly amongst the roots without silk, they simply pressed out a chamber or cell.

History of A. LUCENS

Eggs hatched 24.iv.1975.

Larvae, cylindrical, with little taper, ochreous grey with dorsal vessel evident, anteriorly pinkish, subsequently dark purplish. Head, large, rounded, light reddish; a large semicircular prothoracic plate, ochreous,

grey edged posteriorly, and speckled dark brown, finely divided behind. All legs well developed including anal claspers. Larvae, very active and able to climb easily, dropping by a silk thread when disturbed. The first instar lasted 15 days. After the first moult the prothoracic plate is edged in front by conspicuous black dots and a black lateral streak. There are broad subdorsal lines, broken supraspiracular bands all dark purplish maroon. This pattern was followed in succeeding instars and there were four moults in all.

Description of fifth (last) instar of A. LUCENS

Length 28 mm. Body, broadly cylindrical; taper, only at anal end. Skin, thin and shining through which the dorsal vessel clearly pulsates. Body colour, dull pinkish cream tinged slate blue on the thorax and first two abdominal rings. Few tiny hairs. Warts, small and inconspicuous except on thorax and last three abdominal rings.

Ornamentation consists of weak pale pinkish broad subdorsal bands that become fainter as the larva matures so that they comprise barely a shadow on the later abdominal rings at full growth. The bands begin narrow on the mesothorax gradually growing broader until the 6th and 7th abdominals after which they taper again to the anal plate, on the 9th ring they carry the conspicuous black dorsal warts. The bands are better defined at the lower edge, above they shade imperceptibly into the ground colour. There follows a fine crinkled lateral stripe of the same colour which is gently undulating as it follows the curvature of each ring. Surrounding each abdominal spiracle is a patch of the same pinky colour which is thrown into great prominence by the black warts associated with the spiracle.

Head, warm reddish, shining; mouthparts, darker. Thoracic plate, large, greyish, shining, strongly edged black in front and with two, large black spots there that give a scalloped appearance, and edged finely in black elsewhere, semicircular, two small dots also at the posterior edge, the plate narrowly divided by a pale line and displaying a deep transverse crease. Anal plate similarly edged in black, and preceded on the adjoining ring by a bold short narrow black strip with four large black warts in front. True legs and prolegs creamy grey. Spiracles large, black, oval.

Plate XII figs. 1: second instar, 2: fourth instar, 3 and 4: last instar, 5: last instar at full growth.

Reared on *Poa annua* from female Scorrodale, Orphir, Orkney.
I. Lorimer. Drawn 21.vi.1975. The female was determined by genitalia.

Description of last instar larva of A. PALUDIS

Although Buckler's account is good I give this additional description from moths determined by genitalia examination.

Length to 28 mm. The same pattern and structure as *lucens*. Body colour, drab olive grey inclined to greenish depending on the movement and contortion of the larva. Subdorsal bands, broad, maroon, as wide as the belt of body ground-colour between them. Spiracular band, a series of undulating loops of dusky grey tinged maroon. On the abdominal rings, a fine wavy maroon line between the subdorsals and the spiracular, stronger coloured towards the anal end. Head, globular, ginger, shining; mouthparts, darker; prothoracic plate, large, shining, marked exactly as

in lucens, anal plate also as that insect, and with the same warts intensified and chitin strip on preceding ring. Spiracles black and oval and attended by similar clump of black warts as in *lucens*. True legs and prolegs also as that insect.

Plate XI figs. 6 and 7 fourth instar, 8 and 9 fifth instar. Reared on *Poa annua* from a female, Hayling Island, Hants. Drawn 11.vi.1956.

Eriopygodes imbecilla (Fab.) The Silurian.

Dr. Neil Horton's original discovery of this delightful addition to the British fauna was announced by Heath and Horton *Ent. Gaz.* **24**, 21-9-22 (1973) and Dr. Horton's work subsequently confirmed the species to be resident and to share the habit, long known from abroad of flying by day as well as by night. The reference to *imbecilla* in Wood *Index Entomologicus* 1839 has been well argued by Bretherton to be speculative, and the insect unknown in Britain until Dr. Horton's first capture.

The species has been reared from the egg by Mr. Goater, who described the early stages and full grown larva in *Ent. Gaz.* **29**, 107 (1978), and it was from the inbred second generation of this origin that he kindly sent me larvae from which the figures and following description were made. I received them on 12.xii.1977 and they fed on lettuce, spinach and withered dandelion. They ate large holes in the leaves between the veins and chewed also into the midrib. Frass was black and squashy. They hid away in folds of paper and were sluggish but deliberate in movement, but became agitated and active when placed in the light.

Description of last instar larva.

Length to 26 mm. Body, cylindrical and plump, the dorsum flattened with marked taper on the thorax and from the 7th abdominal ring.

Mid abdominal rings, one and half times broad as long. Head, yellowish brown, rather narrower than the prothorax, weakly marked by a short dark bar above each lobe, mouthparts darker. Prothoracic plate, ochreous brown, squared, crossed by clearly marked white dorsal and weaker subdorsal lines. Anal plate, weakly chitinated, longer than broad, yellowish with broad paler subdorsals and but the weakest trace of a dorsal line. True legs, small, ochreous; prolegs and anal claspers small, poorly developed crochets of greyish ochreous. Skin, soft and matt, nowhere shining or reflecting light, hairs soft, short and sparse except on later abdominal rings.

Body-colour, a warm pinky brown along the dorsum, tinged cinnamon, rust or ginger orange, even greenish ochreous in the region of the subdorsals. A conspicuous series of well-formed dorsal dark brown lozenges, more uniformly coloured in early instars and for a short while after the last moult, thereafter as the skin is stretched the markings become diffused with paler ground colour and less sharply contrasted. The lozenges are most often in the form of diamonds when they reach nearly to the subdorsals, but they can take the form of barrel-shaped ovals; these lozenges are linked at the ring divisions by a blackish bridge, this being a thickening of the darkened edges of a pale dorsal stripe, and this is more easily traced in the mature larva. On the later abdominals the dorsal pattern is more sharply defined while on the thorax it is still discernible but somewhat lost into the darker suffused ground colour. Subdorsal lines of palest ground colour, a broken whitish stripe on the thorax, but throughout the abdomen indicated only by the fine sinuous dark brown

line at its upper edge, and to each side of the ring division, more boldly by a deep black streak at the centre of each ring below. These black streaks are contained in a broad greyish band, flecked and streaked darker, and below this there follows a still broader greyish similar band. Next a broad wavy subspiracular band, basically a pale stone colour, but much suffused dark pink or brown and sharply bounded at its upper edge by a fine dark line that is boldest at the centre of each ring. The larva beneath is rich rosy pink. Spiracles, small jet black ovals, paler centred, set on a whitish patch of skin centrally in the abdominal rings at the very upper edge of the subspiracular band. The lateral warts adjoining them are flattened, tiny, dark grey and shining, the dorsal trapezoidals being similar but set on pale uncoloured skin.

Eriopygodes imbecilla differs from the *Mythimna* (Leucania) type larva in the following ways: -

1. In *Mythimna* the subdorsal black streaks are situated within the lines of the stripe, often obliterating the paler ground colour. In *Eriopygodes* the dark streaks are placed clearly below the subdorsal line. *Eriopygodes* and *Hoplodrina* (formerly *Caradrina*) appear to be alone in having this arrangement.
2. The body shape of *Eriopygodes* is much more tapered than is *Mythimna*.
3. *Eriopygodes* head capsule is flatter, much less globular, and smaller than the prothorax.
4. *Eriopygodes* anal claspers and prolegs are much smaller and weaker.
5. *Eriopygodes* skin texture is softer and more rugose.
6. *Eriopygodes* anal plate is weaker chitinised and poorer marked.

Eriopygodes imbecilla differs from *Mythimna turca* in most of those points but in addition *turca* has no subdorsal streaks at all. The dark intersegmental bridges that link the dorsal lozenges are present in a number of other widely separated genera viz. *Amathes*, *Polia* and *Anarta* to name but a few, but they are not present in *Mythimna* (Leucania) whereas they are a feature of *Mythimna turca*.

Plate X figs. 4-6 all last instar, on dandelion and lettuce, from a South Monmouthshire, female taken by B. Goater and reared by him. 28.xii.1977.

Chrysodeixis chalcites (Esper) Golden twin-spot.

The *Plusia* migrants to Britain include both very common, regular visitors and also some of the rarest, and *C. chalcites* is one of the outstanding scarcer vagrants. Mr. D. R. Stephenson found a female in his M.V. trap on the night of 8.x.1979 at his home in Cowbridge, South Glamorgan, and with commendable courage kept the moth for eggs. He was rewarded with over one hundred laid that night and they hatched ten days later. After the first instar the young larvae showed their characteristic black true legs and lateral warts. Mr. Stephenson most kindly sent me five larvae in the third instar. They fed voraciously on stinging nettle at indoor room-temperatures and spun their typical *Plusiid* silken cocoons on 14 November. The earliest to complete pupation did so within 24 hours and became totally black a short while after. Moths emerged on November 27 and 28.

Description of last instar larva

Body colour a pale yellow green with yellow intersegmental folds. A narrow dorsal line from head to anus that dilates as the dark dorsal vessel pulses. There are three fine wriggling lines to each side, the middle broader and all irregular in outline. Next a broad dark green supra-spiracular band edged below by a bold white line. Head, pale unicolorous glassy green edged by a narrow black streak. Ocelli and warts, jet black; spiracles, cream, oval, situated within the white stripe on the thorax, on abdominal rings 1-3 and again on the humped 8th. Warts, whitish except for the laterals which are larger, jet black, and placed in the dark green supra-spiracular band. Prothoracic plate, weakly chitinised pale green mottled whitish, the prothoracic spiracle preceded by the largest of all the black warts. (*) Anal plate, green also mottled whitish. Prolegs on abdominal rings 5 and 6, fleshy, translucent, sometimes with black shading at the base of the third pair.

This larva belongs to the smaller and more slender *gamma* form of the tribe that have the row of conspicuous black lateral warts; they are less obese, less rugose and more simply striped than the *chryson/chrystis* form. If encountered wild, it would be passed over as *gamma*.

I am pleased to record my indebtedness to Mr. Stephenson for sending these larvae.

Plate XII fig. 9 third instar; 10-12, all last instar reared on stinging nettle from female taken at Cowbridge, S. Glamorgan by D. R. Stephenson. Drawn 4.xi.1979 and 9.xi.1979.

The genus Epirrita

Of the four British insects of this genus, the larva of *filigrammaria* (Herrich-Schäffer) is the most readily separable at full growth; the illustration in Buckler Vol. 8 plate 147 fig. 8 adequately conveys its more usual appearance. Larvae of the other species while displaying parallel variation are frequently more highly patterned, and although when reared in quantity from parents of known identity individual differences can be made out, these same distinctions are rarely put to the test against moths reared from wild collected larvae.

Louis Prout (in Seitz, *Macrolepidoptera of the World*, 4, 194-7) as far back as 1912 summarised the food preferences of the three insects thus — *christyi* (Allen) from beech and elm, *dilutata* (D. and Schf.) on oak and hawthorn, *autumnata* (Borkh.) on birch and alder, although other plants were eaten by each of them. So much interest was shown in the group in succeeding years that Prout was able to expand greatly the information on the moths available in 1934 (Seitz Supplement 4, 96-97) but the only additional data on larvae derived from Heslop who associated red-brown *christyi* with wych elm, purplish *dilutata* with oak, and green *dilutata* with ash; Heslop suggested that individual colonies showed significant distinction not only in adult appearance but also in the food preference of larvae. So the question of whether recorded host plants had any local significance or particular larval association remained largely unanswered.

(*) Larvae of this species-group reared in Bagdad from ova agreed with the above, but those found in the wild were often less black-marked, the lateral setae not being black. (Editor).

For the past ten years Dr. M. Harper has been investigating this very problem of food preference in *dilutata* and *christyi* where they occur together in Herefordshire. Dr. Harper's work appears in this issue of the Proceedings of this Society, but he has most kindly allowed me the benefit of reading his manuscript so that his results may be included in the paper. Dr. Harper studied four different yet adjacent habitats and found *christyi* larvae more numerous than *dilutata* in the woodland habitat, and that the roles were reversed in open country. He found *christyi* and *dilutata* shared a number of host plants with the former more numerous on birch, hawthorn and hazel in the woodland, and *dilutata* more numerous on oak in all situations. In this locality only *christyi* was found on beech, blackthorn and wych elm. One of Dr. Harper's most fascinating discoveries was that the frequencies of these two species on oak and hawthorn changed in relation to the distance from the wood, *dilutata* becoming the most dominant in highly cultivated arable land where close and regular hedge trimming was done. A similar result was obtained in grazed parkland, so it is possible that outside its preferred woodland habitat, *christyi* has the habit of laying its eggs lower on its host plant and thereby suffering a higher egg and larval mortality in open country than *dilutata* which may utilise a wider range of elevation.

I agree with Prout and Cockayne (*Amatuer Entomologist* 1941, 5, 29) that the larva of *dilutata* is more bright and velvety green with usually a sharper marked dorsal pattern of deep red or purple, and with Cockayne's diagnosis of *christyi* as having dulled or smoky markings. Also both appear correct in describing *autumnata* as paler green and with its dorsal markings much more restricted, often quite absent.

Epirrita christyi (Allen) Pale November moth

Description of last instar larva

Length to 20 mm. Colour a weak yellow-green on the dorsum, much shaded with warm reddish brown and commonly with this colour spread across the posterior subsegment of all abdominal rings. The thorax is shaded with darker blue-green and brown and the last three abdominal rings are often coloured dark-brown. Abdominal rings shaded darker at the divisions and with fine narrow yellow fold at the posterior edge. The dorsal line is weak and broken on the thorax but continuous from the first abdominal until the penultimate ring. There is a faint crinkled continuous subdorsal line of yellow-green and another slightly bolder similar line between the subdorsal and the subspiracular band, which itself is snowy white and runs unbroken from the very rim of the prothorax right on to the anal flap, being bolder and rather broader on the thorax and again on abdominal rings 7 and 8. Beneath the skin is a powdery white faintly tinged cobalt.

Prothoracic plate, weakly chitinated, pinky brown, studded with whitish warts; anal plate, heart-shaped, pinky brown, bearing warts of the same colour. Head, ochreous or yellow-green, weakly lobed, bearing weak mottling above in the stronger marked forms, ocelli black, mouthparts dark brown. True legs, yellow-green; prolegs, either pale green or pink; anal claspers, always pinky brown. Spiracles, orange, finely bordered in black, oval, situated clear above the white subspiracular band. Warts, dull white, conspicuous, each bearing a fine short bristle.

Although variable in pattern and somewhat in the shade of green, this larva is commonly a heavily shaded red-brown with the pattern obscure

and gently suffused into the green so that even in the simplest marked individuals there is no stark pattern of well defined markings as is usual in *dilutata*. Instead the general appearance of *christyi* is of a soft terracotta larva with bold white subspiracular bands. In the least marked and unmarked forms the ground colour appears much tinged with yellow, not emerald or bright green.

Plate XIII figs. 1-7, all last instar, reared inbred from parent female taken at Ranmore Common, Surrey, by B. Skinner. Reared on hornbeam, 25.iv.1972.

Epirrita dilutata (Denis and Schiffermüller) November moth

Description of last instar larva

Ground colour, a rich velvety green, the rings edged weakly pale green to yellow at the divisions. Dorsal stripe, much broken, consisting of a series of strong streaks, one to each ring, continuous on thorax and on last three rings. Fine, wavy subdorsals and another line between them and the (subspiracular), appear as translucent white, and although very faint at the extremities all these lines can be traced from prothorax to anal flap. Subspiracular band white, bolder and broader on the thorax and last three rings. The pattern varies from no more than a series of short transverse streaks crossing the dorsal stripe through increased dorsal shading, that extends as a lateral network surrounding the spiracles and appears as a narrow edge to the subspiracular band. Ultimately the whole body may be uniformly darkened except for the pale ring divisions. On the thorax the pattern may assume the character of a broad transverse band streaked with green; on the last three rings it again assumes a richer and stronger hue. The colour of this variable pattern may be plum, maroon or claret, or rich dark brown touched with crimson. The body tubercles stand out white on this background. Beneath, the body is inclined to cobalt or blueish white. Prothoracic plate weak, a mosaic of marbled brown and green, anal flap pale brown. Spiracles golden, oval, anal claspers pale green shaded pinky brown.

Completely plain green forms are common with the white subspiracular band showing as boldly as in other forms, Buckler's figures in Vol. 7 (plate 126, fig. 4) are not a good set, for figs. 4a, 4b instead indicate *autumnata*; and the later drawings (Vol. 8 plate 147, fig. 6) better represent the simpler marked form of *dilutata*.

Plate XIII figs. 8-11, all last instar, reared ex female Tilford, Surrey, on hornbeam, 30.iv.1971 figs. 12-15, all last instar, reared ex female Leith Hill, Surrey, on oak 23.iv.1971.

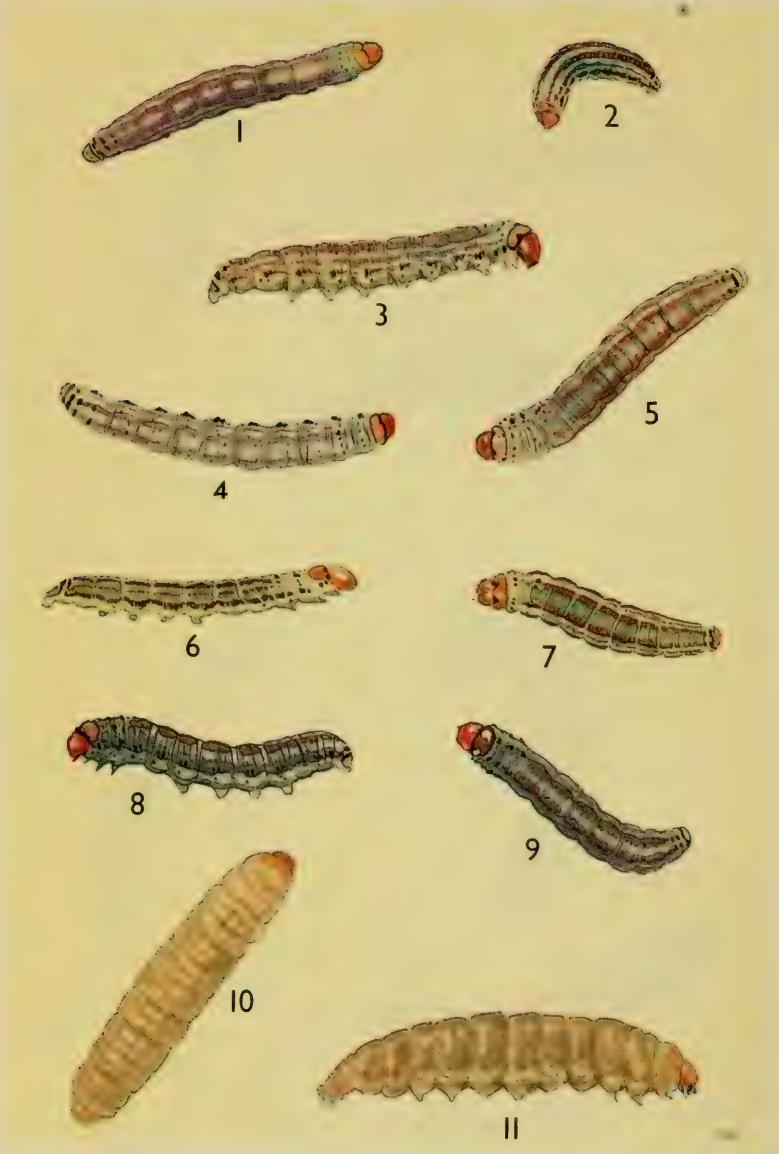
Epirrita autumnata (Borkh.) Autumnal moth

Description of last instar larva

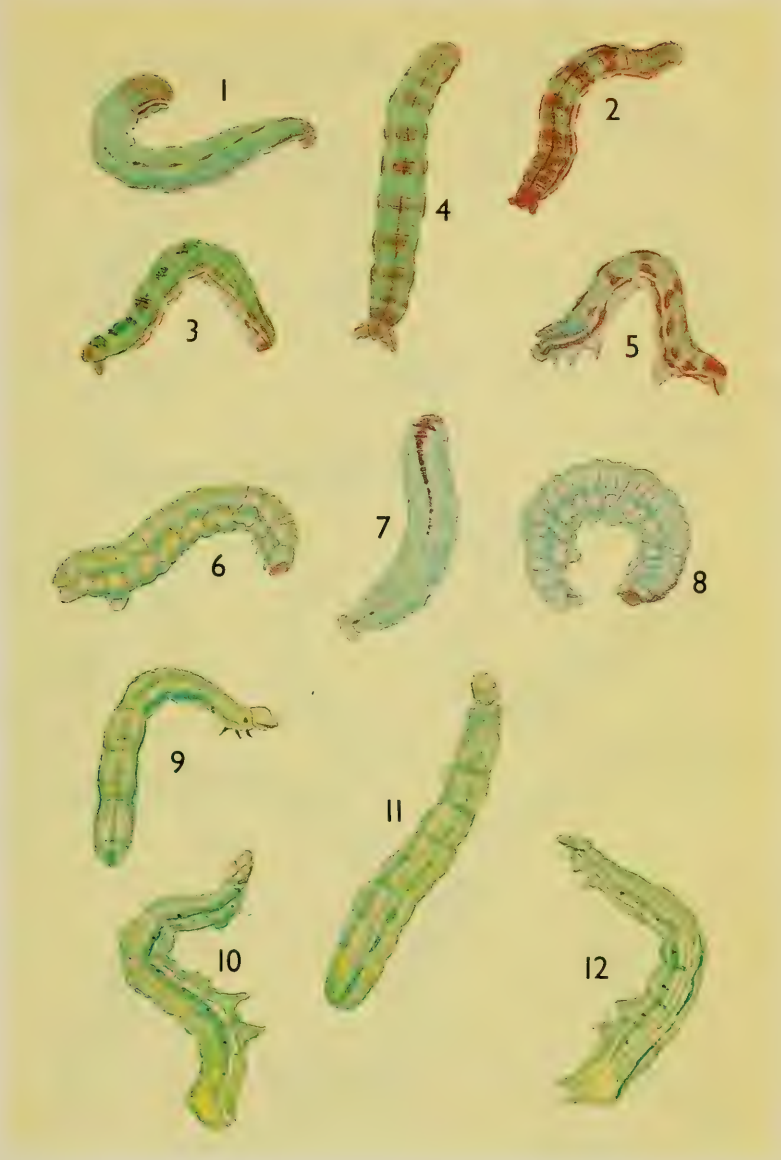
Although the green body colour is variable it is more frequently pale cobalt with prominent whitish pallor than the other two insects, and except just after the last moult rarely assumes a yellow tinge. It is a more delicately coloured and discreetly marked larva. The brown pattern is lighter etched and usually rose or pale sienna, but can be sharply rust, but it is always neat and cleanly defined. An infrequent form has only the dorsal line and the lateral flange tinged brown plus some shading at the thorax and penultimate ring. The heaviest marked examples display broader suffused brown dorsal patches, still clearly defined and well separated, and not at all spread as in the other species. Ventrally,



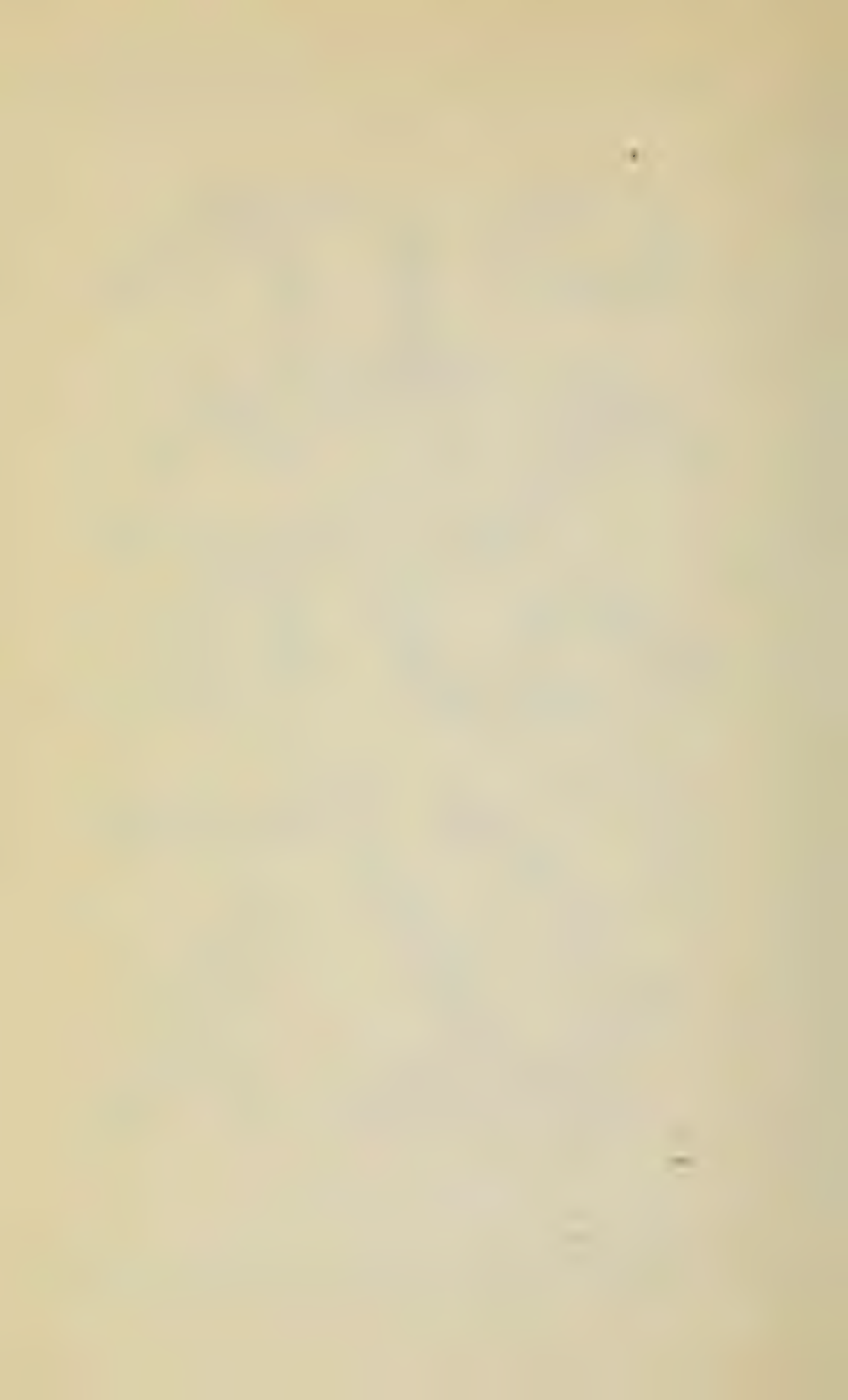
1-3 *Mythinna loreyi* (Dup.)
4-6 *Eriopygodes imbecilla* (Fab.)

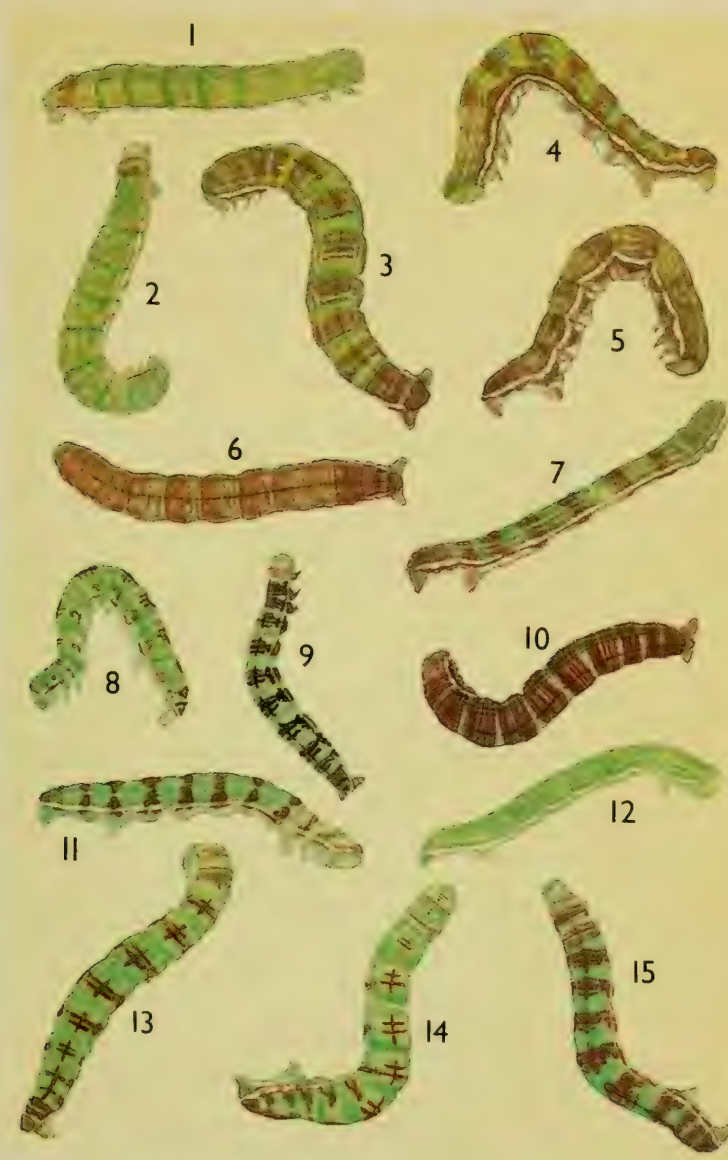


1-5 *Amphipoea lucens* (Freyer)
6-9 *Amphipoea paludis* (Tutt)
10-11 *Luperina nickerlii* (Freyer) *leechi* (Goater)

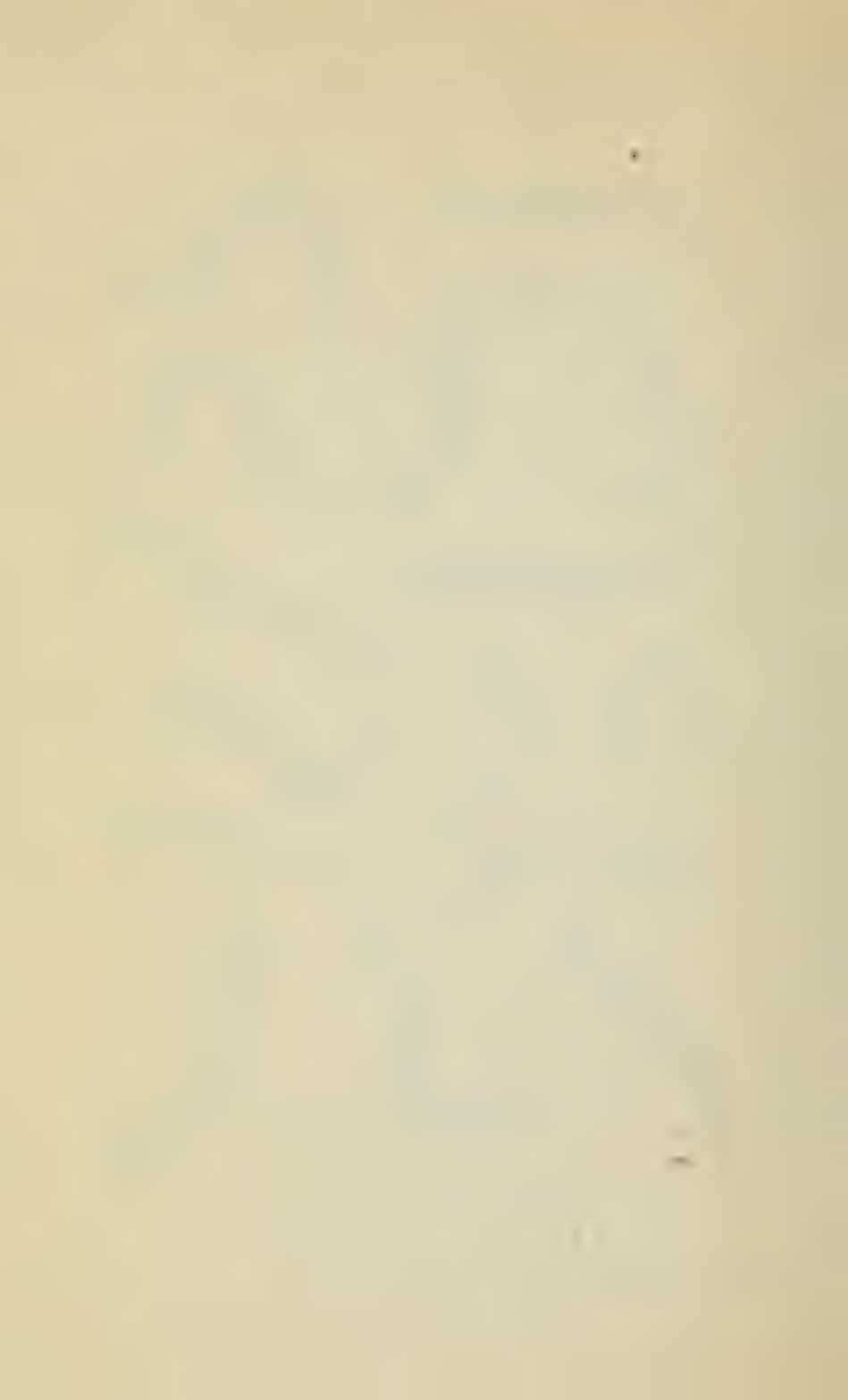


1-5 *Epirrita autumnata* (Borkh.)
6-8 *Chloroclystis chloerata* (Mabille)
9-12 *Chrysodeixis chalcites* (Esper.)





1-7 *Epirrita christyi* (Allen)
8-15 *Epirrita dilutata* (Denis and Schiffermüller)



the body is constantly milky white tinged cobalt. The white lateral subspiraculars are as conspicuous as in the other two insects.

Buckler's figures Vol. 8 plate 147 fig. 7 show the unicolorous green form with enlarged drawings showing a strong dorsal stripe broken only at the ring divisions, whereas all those examples I have reared had the stripe broken into short streaks common to all three species.

Plate XII figs. 1-5 all last instar, reared ex female Bramley, Surrey, by R. Bretherton, reared on hawthorn 12.v.1974.

Chloroclystis chloerata Mabilie. The Sloe Pug.

Mr. Pelham-Clinton's discovery of this larva in 1971 (*Ent. Gaz.* 23, 151) was followed by a spate of records that continue to this day to extend the known distribution in Britain. The south-eastern territory seems to reach no further west than Gloucestershire, but northwards the larva has been found in Westmoreland and Lancashire in the west and in Yorkshire and Lincolnshire in the east.

The optimum habitat is undisturbed, long established blackthorn thickets where there is shelter within; for exposed, isolated and small clumps usually prove to be untenanted, as do trimmed hedges and low-grown beating blossom that is faded and dropping. The pupa is also of short period from expanding flower-bud to petal-fall; it is rarely any good beating blossom that is faded and dropping. The pupa is also of short duration but the egg lasts from June until the following spring. The larva rests most commonly with its front parts buried into the receptacle of a flower, or else spun in a loose web of flowers and curled within.

Description of last instar larva

Length to 10 mm. when fully extended. Shape broadly cylindrical, rather stubby with sharp taper to the diminished last three rings, the thorax but slightly narrower than the rest of the body, the head held well into it at most times giving the general appearance of a weevil grub especially in its curled position at rest with all legs hidden. Lateral fleshy cushions are well developed on all rings and especially on the abdomen. Body colour ranges from whitish blue to lime or weak citrus, always pallid, the fleshy but transversely wrinkled skin rather translucent and displaying light patterns depending how the body is contorted. There is a weakly expressed mediodorsal stripe of dull grey-green visible on all rings, but bolder on the thorax and first four abdominals, and on these rings it may be coloured a rich maroon. Some larvae show thin transverse streaks of maroon at the thorax. The maroon markings appear again as short vivid splashes on the very anterior parts of the penultimate two rings. There is the impression of a dull grey-green lateral band running the length of the body just above the lateral cushions.

Head, pale brown with darker mouthparts and more dark mottling on the sides of the lobes. True legs and claspers, greenish, the anal claspers of red-marked larvae bear a bright longitudinal maroon streak. Anal plate, with fine dark speckles. The tiny round spiracles are buff coloured and the minute tubercles are black and support the finest and shortest of bristles. Prothoracic plate well developed, pale brown.

Plate XII figs. 6-8 all last instar on blackthorn flowers, Lissington, Lincs. 26.iv.1975.

OBSERVATIONS ON *EPIRRITA DILUTATA* (DENIS & SCHIFFER-MULLER) AND *EPIRRITA CHRISTYI* (ALLEN) (LEP., GEOMETRIDAE.) IN HEREFORDSHIRE.

(with six text figures and two tables)

by M. W. HARPER

(Cherry Orchard, Bullen, Ledbury, Herefordshire)

INTRODUCTION

All four species of the genus *Epirrita* Hübner occur in Herefordshire, although only *E. dilutata* and *E. christyi* occur near Ledbury in the eastern half of the county. *E. autumnata* (Borkhausen) is found along the margins of the Malvern hills and locally in other areas in the county closely associated with birch or alder woodland. It has been recorded occasionally from the area under study, presumably wanderers from nearby breeding colonies. *E. filigrammaria* (Herrich-Schäffer) is restricted to the highground above 1500 feet on the extreme western fringe of the county, the larva feeding on *Calluna vulgaris*.

Since the original description of *E. christyi* as a separate species in 1911, J. E. R. Allen described the macroscopic and genitalic features of this critical species. He also described the habitat where this species had been found locally amongst beech and elm in Ireland. Larvae were found feeding on the foliage of these trees and occasionally on alder, birch, and willow. My own experience in south-east England, suggested that *E. dilutata* was widely distributed and common in deciduous woodlands and farmland, while *E. christyi* was more localised, usually to beech dominated woodland. Certainly in Herefordshire this is not the case, where the latter species is to be found flying in many deciduous woodlands with a very varied and mixed number of species in the shrub and canopy layers. In view of the fact that both are successful species in this area, it seemed a good opportunity to try to assess a few simple aspects of their ecology to pupal and biotype preferences and also flight periods.

In attempting any study of this genus and especially *E. dilutata* and *E. christyi*, the macroscopic features which separate the imagines and larvae should be clearly definable and reliable under field conditions. Unfortunately this is not so and in my experience the larvae cannot be clearly distinguished at any stage of development, even in the final instar. J. W. Heslop Harrison however, while working on the two species in Northumberland, found the predominantly reddish brown larvae to be *E. christyi*, while the purple forms belonged to *E. dilutata*. In Herefordshire the predominant form in both species is green, while both can produce forms with variable red segmental and intersegmental markings. The colour tone in *E. dilutata* is an intense grass green which differs from the lighter green of *E. christyi*. However I feel that these marginal characters are not sufficiently reliable for accurate identification.

The determination of the imagines is fortunately possible on macroscopic grounds but the criteria for separation are critical. It is not intended to describe these in any detail but the following points may help to distinguish them. The wingspan of *E. christyi* is on average smaller than *E. dilutata* while the apico-tornal or outer marginal distance of the forewing is the same for both species. As a result the former appears to have a relatively broader forewing which contrasts well with the latter in profile of both set specimens or those seen at rest in the wild. The post-median fascia of the forewing of *E. christyi* is angled around the

cell spot while in *E. dilutata* the fascia runs straighter to the costa often touching the cell spot. The slight ochreous tinting and glossier appearance in the former further help to distinguish the species. In this area, only *E. christyi* produces a melanic form referable to *ab. oblita* Allen. With a little experience the criteria mentioned form a reliable basis for species identification in the field. Only an occasional male moth required critical examination and this was achieved by examining the position of the octavals on the ventral aspect of the eighth abdominal segment.

METHOD

The following studies were attempted: — (1) Flight periods of the two species. (2) Pabula and biotype observations.

(1) Flight periods

Nightly counts were made, starting just before the imaginal emergence of the two species in early October and continued throughout November and into early December. All moths were examined at the lighted windows of my house (see Fig. 1 Area E), situated on the north-western tip of Dog Hill wood and also on the edge of the town's suburbs. They were collected at midnight, identified and released on site. Mercury vapour light trapping was not used. The counts were continued for three years 1971-1973.

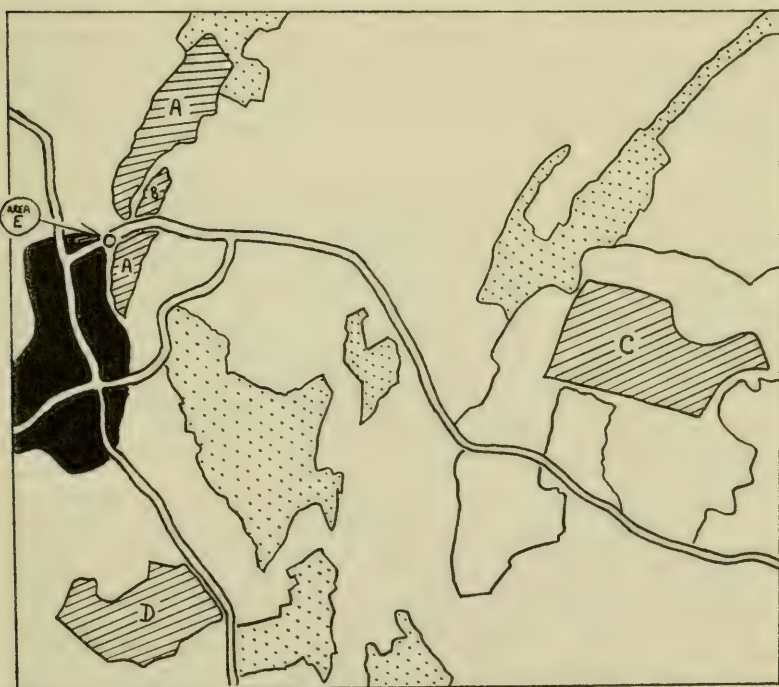


Fig.1. Sketch map of area in which *Epirrita* spp. were studied. Solid black: Ledbury town. Dotted area: deciduous or coniferous woodland. Oblique lines: study areas:— A: Dog Hill wood and Frith Wood. B: Bradlow farm. C: Eastnor Park (maximum extent of park is indicated by a line enclosing a whit area. D: Hall house farm.

(2) *Pabula* & biotypes

Initially I was interested in the possible differences that might exist in the larval foodplants for the two species within one biotype (viz. deciduous woodland) but a far more complete picture can be achieved by including other habitats, albeit "man influenced" and consequently less natural than these woodlands. These were:—

Area (A) Dog Hill & Frith Woods (deciduous woodland).

Area (B) Bradlow Farm (old farmland hedgerows).

Area (C) Eastnor Park (deer grazed parkland).

Area (D) Hall House Farm (highly cultivated farmland).

Area (A). Comprises the whole of Dog Hill wood and the southern end of Frith wood. The northern end of Frith wood has been felled during the last 10-12 years and replanted with conifers, and was not included in the study. Both woods are contiguous, separated by 500 yards of farmland, and follow the same Silurian limestone outcrop. The 31 species of trees, shrubs and climbing plants that occur here are shown in Table (2), together with their approximate relative abundance. This demonstrates the wide diversity of plant species found, contrasting with the situation in Areas (B & C) where only four and six species respectively are found. Oak, ash, birch, gean, sycamore, and large leaved willow are the commoner canopy trees while the shrub layer is dominated by hazel and hawthorn. Wych elm and also common elm, having suffered the ravages of Dutch elm disease in the early 1970's, have been virtually exterminated from the two woods by 1974 and persist only as isolated coppice remnants. Dog Hill wood was thinned in 1976 without any clear felling.

Area (B) comprises a small area of farmland separating the two woods in Area (A). It contains an old uncut hawthorn hedgerow, and a single mature oak. Apart from a little blackberry and rose, this hedgerow runs the full 500 yards between the woods and is only lightly grazed by cattle.

Area (C) forms the centre of Eastnor Park. The principal vegetation is composed of mature oak (mostly *Q. petraea*) and hawthorn, either in isolation or in small stands. Red deer graze the hawthorns as well as the lower branches of the oaks. Natural regeneration is scarce although there is a fair amount of bracken ground cover. The only other trees are a few mature yews and ash. The park is surrounded by farmland and also by dense deciduous woodland similar to area (A), while to the east the western slopes of the southern Malvern hills come to within a mile of the park.

Area (D). Hall House Farm is composed of 200 acres of highly cultivated farmland where the main crops are wheat and barley. There are no grazing animals and a small apple orchard has been retained in one part of the farm. 70-80% of the hedgerows are subjected to modern mechanical hedgeclipping techniques and are consequently of short stature, about 4 feet high. Trimming takes place in November and December and less often after harvesting in September. Taller unclipped hedgerows persist along ditches and a small stream that runs through the farm. The hedgerow species are listed in Table 2, while oak, ash, and white willow occur as mature trees in a few places. Insecticide spraying by aeroplane usually takes place once a year in late June against Aphis. Fortunately this occurs after the full-fed larvae have left their foodplants at the end of May to pupate below ground.

This project took ten years to complete from 1969-1979, partly due to the numerous larval samples, all of which were bred through to the adult moths, that were collected or searched for from all the plant species mentioned in all four biotypes. Furthermore samples were taken every second or third year for each proven pabulum in the four areas. Although these samples were small it was hoped that by spreading these over a ten year period, errors due seasonal population fluctuations would be minimised. Larvae were collected by tapping the foodplant onto a beating tray, and care was taken to beat only one species at any session avoiding any intertwining of other plants. 7-8 hours were devoted to each plant species so that an approximate quantitative comparison could be made for the samples. A constant 45%-55% mortality rate existed for all samples, so that half the larvae produced imagines. These were identified and released away from the study areas.

RESULTS & DISCUSSION

(1) Flight periods

The nightly counts for both species of *Epirrita* for the three successive years 1971, 1972, and 1973 are shown as histograms in Figs 2-4 inclusive. These demonstrate an earlier emergence of *E. dilutata*, ranging from 7-12 days before *E. christyi* starts, while the former species also reaches peak flying numbers before the latter. The total numbers for both recorded in 1972 & 1973 were approximately equal. In 1971 however, the population of *E. christyi* rose to over twice the numbers of *E. dilutata* (217: 100) as shown in Fig. 2. This histogram shows a prolonged flight period for the former species, probably due to an increased survival with stragglers being recorded into December.

(2) Pabula and biotypes

The four study areas A-D are shown on the map (Fig. 1.). All these areas are within two miles of each other. The tree and shrub species in all four biotypes are shown on Table 2, totalling 32 in all. No less than 31 of those occur in the woodland (Area A). Groups (3 & 4) show these species which are apparently unacceptable pabula to the genus *Epirrita*. Many of these and especially those in Group (4) (Non-deciduous spp) are to be expected. Common trees such as ash, gean, and large leaved willow are unacceptable, as are the common shrubs and climbers e.g. rose, blackberry, elder, broom, dogwood etc. It is remarkable that large leaved willow (*Salix caprea*) is apparently unacceptable in this area. I have seen larvae of the genus on this undoubted foodplant in other parts of Britain and P. B. M. Allan states that no less than three species (*E. dilutata*, *christyi*, & *autumnata*) feed on *Salix*. I have bred *E. dilutata* from white willow (*S. alba*) in other parts of Herefordshire but failed to find it on the few mature trees in Area (D). Group (2) viz. gean, privet and dog rose are the plants on which only single larvae were found. Only one larva continued to feed on gean producing a single *E. christyi* while the others failed to feed, suggesting inadvertent larval dispersal.

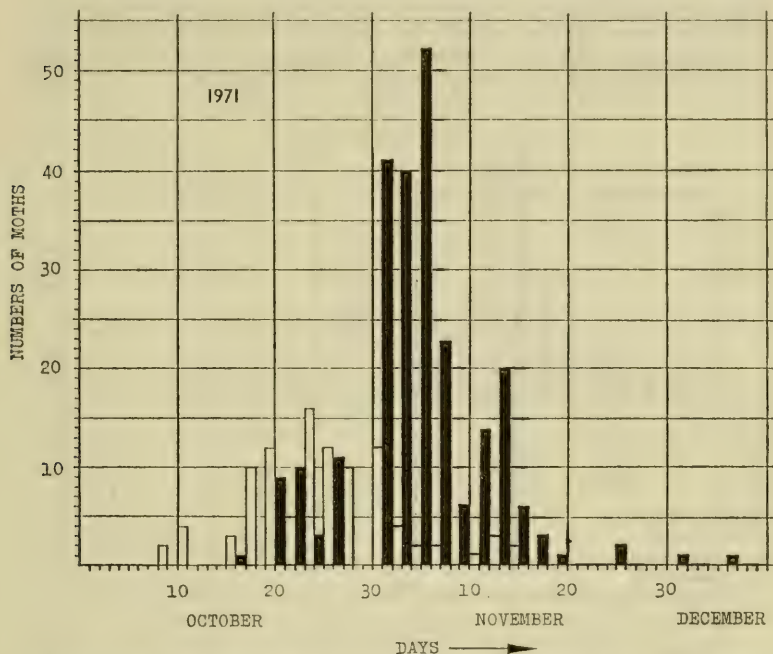
The regular pabula are shown on Table 2, group (1). Beech, blackthorn, common elm, and aspen were rare in Area (A) and I was unable to devote the full eight hours fieldwork, even by spreading the samples to an annual count. Aspen was so scarce that only a few accessible small saplings were available for search and I failed to breed through these few larvae which were however undoubtedly feeding on this foodplant. Elm and wych elm had virtually disappeared by 1974.

TABLE 1
NUMBERS OF MOTHS BRED FROM FOODPLANTS WITHIN THE FOUR BIOTYPES

FOODPLANT	AREA (A)		AREA (B)		AREA (C)		AREA (D)	
	DILUTATA	CHRISTYI	DILUTATA	CHRISTYI	DILUTATA	CHRISTYI	DILUTATA	CHRISTYI
OAK (<i>Quercus</i> spp.)	23	5	6	0	16	0	23	0
BEECH (<i>Fagus</i>)	0	2						
BIRCH (<i>Betula</i> spp.)	3	27						
BLACKTHORN (<i>Prunus</i>)	0	6						
HAWTHORN (<i>Crataegus</i>)	6	34	22	12	15	3	40	2
HAWTHORN (Clipped)							2	0
MAPLE (<i>Acer</i>)	5	8					22	1
MAPLE (Clipped)							0	0
COMMON ELM	6	5						
COMMON ELM (Clipped)							0	0
WYCH ELM	0	15						
SYCAMORE	2	2						
HAZEL	5	53					22	1
SMALL-LEAVED LIME	1	8						
ASPEN	0	0						
	51	165	28	12	31	3	109	4

(1) E.AUTUMNATA

FIG. 2.

FLIGHT PERIOD OF *EPIRRITA DILUTATA* & *CHRISTYI* IN 3 SUCCESSIVE YEARS

The sample frequencies of the two species bred from foodplants within the four biotypes are shown on Table 1. *E. dilutata* was reared from eight out of a possible twelve pabula, while *E. christyi* was bred from eleven. The more important of these from woodland (Area A) are shown on Fig. 5. This histogram demonstrates the numerical preponderance of *E. christyi* for most of the foodplants mentioned in this biotype. The largest samples were bred from hazel (53), while hawthorn and birch produced samples of 34 & 27 respectively. Other species such as blackthorn, wych elm, and small leaved lime with small samples still show this trend. The exception is oak (*Quercus* spp.) where this preponderance is reversed in favour of *E. dilutata* (23) to *E. christyi* (5). Area (B) (Bradlow Farm) which separates the two woods (Area A) produced a small sample of the former species from the solitary oak (6). The tall hawthorn hedgerow was sampled along its middle section omitting the 50 yards of hedgerow adjacent to the two woods. Here the sampling results were in favour of *E. dilutata* (22) to *E. christyi* (12).

The more isolated hawthorns of Eastnor Park (Area C), at least 300 yards from woodland, showed a reduction in *E. christyi* numbers (3) to those of *E. dilutata* (15). The latter was the only species reared from samples from oak (16). In Area (D) (Hall House Farm) the hedgerow vegetation is even further away from the nearest deciduous woodland (800 yds.). *E. dilutata* once again is the only species reared from oak

samples (23), while the tall unclipped hawthorn hedgerows produced an even more pronounced swing to *E. dilutata* (40), with only (2) *E. christyi*. These oak and hawthorn results are shown on Fig. 6 as histograms together with the samples taken for hazel and maple from just two areas (A & D). Although the samples are small, the results do indicate that both species are polyphagous especially within their preferred environment. *E. christyi* appears to dominate close canopy deciduous woodland, where the preferred

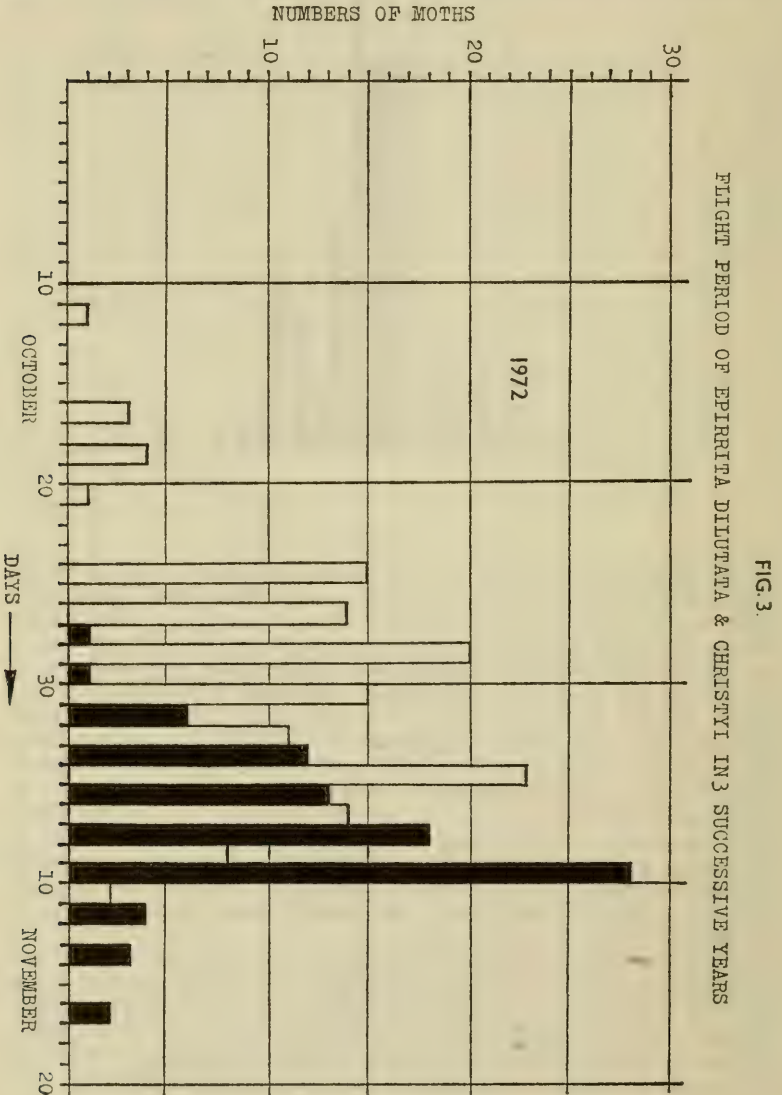


FIG.4.

FLIGHT PERIOD OF EPIRRITA DILUTATA & CHRISTYI IN 3 SUCCESSIVE YEARS

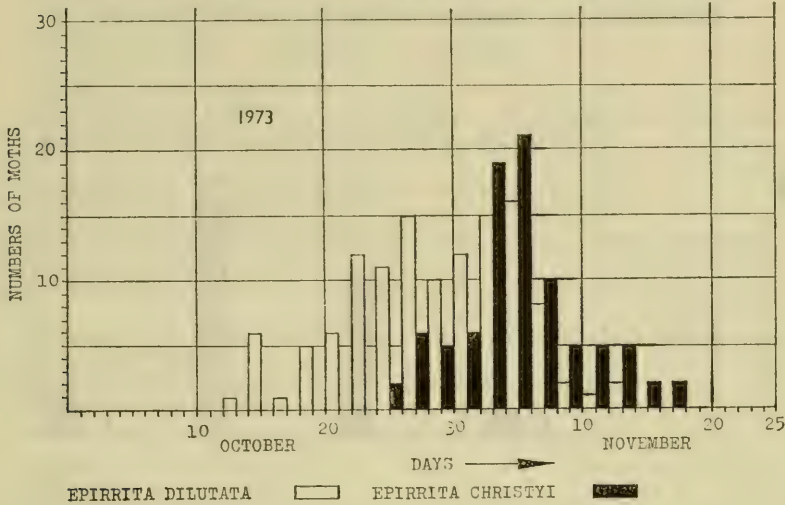


FIG.5.

HISTOGRAM TO SHOW THE RELATIONSHIP OF EPIRRITA DILUTATA AND CHRISTYI TO THE COMMONER PABULA IN WOODLAND (Area A)

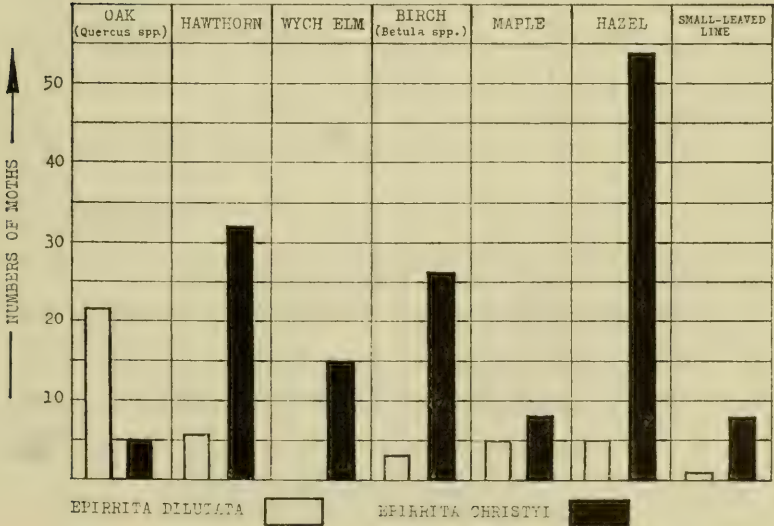


FIG. 6.

HISTOGRAMS TO SHOW SPECIES/BIOTYPE RELATIONSHIP TO
FOUR PLANT SPECIES

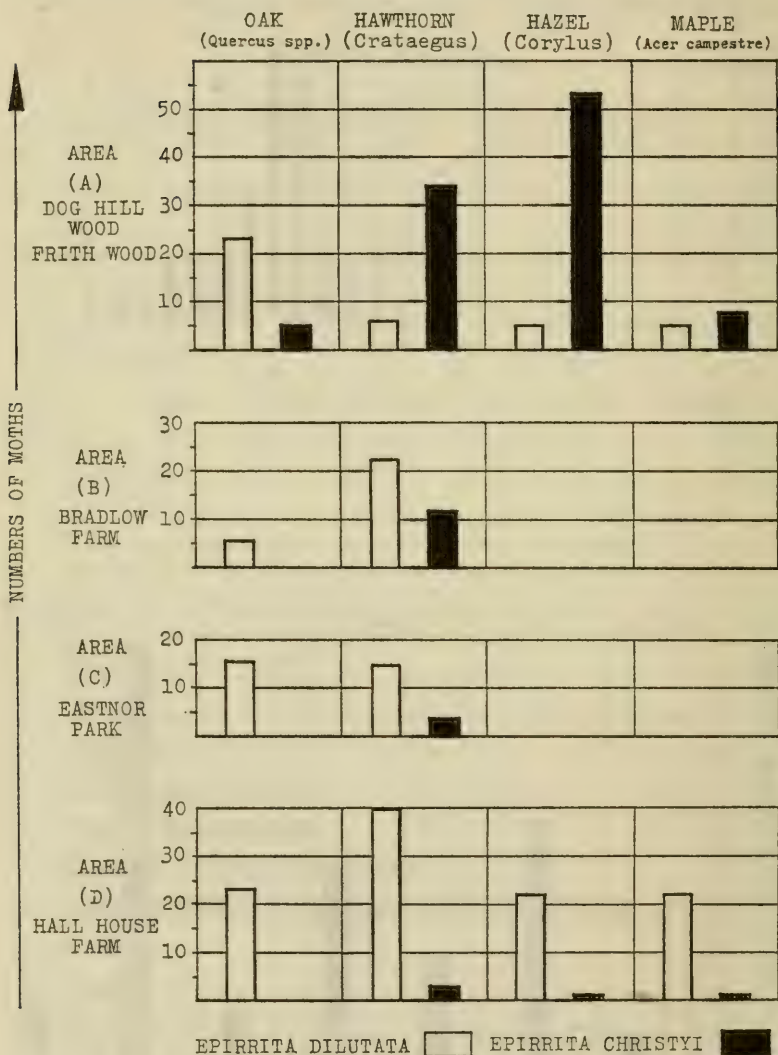


TABLE 2

	A	B	C	D
GROUP (1)				
EECH (<i>Fagus sylvatica</i>)	*			
IRCH (<i>Betula pendula</i> & <i>pubescens</i>)	***			
LACKTHORN (<i>Prunus spinosa</i>)	*			
OMMON ELM (<i>Ulmus procera</i>)	*			*
WYCH ELM (<i>Ulmus glabra</i>)	**			
AWTHORN (<i>Crataegus monogyna</i>)	***	****	***	***
HAZEL (<i>Corylus avellana</i>)	***			**
COMMON MAPLE (<i>Acer campestre</i>)	**			**
YCAMORE (<i>Acer pseudoplatanus</i>)	***			
MALL LEAVED LIME (<i>Tilia cordata</i>)	**			
WYCK (<i>Quercus robur</i> & <i>petraea</i>)	***	*	***	**
SPEN (<i>Populus tremula</i>)	*			
GROUP (2)				
SLAVEN (<i>Prunus avium</i>)	***			
RIVET (<i>Ligustrum vulgare</i>)	**			
DOG ROSE (<i>Rosa canina</i>)	**	*	*	*
GROUP (3)				
ASH (<i>Fraxinus excelsior</i>)	***		*	**
WHITE WILLOW (<i>Salix alba</i>)				**
LACKBERRY (<i>Rubus fruticosus</i>)		*	**	**
DOGWOOD (<i>Thelycrania sanguinea</i>)	**			*
ROOM (<i>Sarothamnus scoparius</i>)	**			
WEET CHESTNUT (<i>Castanea sativa</i>)	**			
LACK CURRANT (<i>Ribes nigrum</i>)	*			
ELDER (<i>Sambucus nigra</i>)	***			
WONEYSUCKLE (<i>Lonicera periclymenum</i>)	**			*
RAVELLER'S JOY (<i>Clematis vitalba</i>)	**			
PINDLE (<i>Euonymus europaeus</i>)	**			*
ARGE LEAVED SALLOW (<i>Salix caprea</i>)	***			
GROUP (4)				
AUREL (<i>Aucuba</i> spp.)	**			
PURGE LAUREL (<i>Daphne laureola</i>)	*			
OLLY (<i>Ilex aquifolium</i>)	**			
EW (<i>Taxus baccata</i>)	**		*	
WY (<i>Hedera helix</i>)	**	*	*	*

TABLE TO DEMONSTRATE THE TREE & SHRUB SPECIES
WITHIN THE FOUR STUDY AREAS

Area (A) Doghill & Frith Woods Area (D) Hall House Farm
Area (B) Bradlow Farm Area (C) Eastnor Park

The approximate frequency of species is indicated: -

Common **** Infrequent **
Frequent *** Occasional *

GROUP (1) Regular foodplants

GROUP (2) Occasional foodplants

GROUP (3) & (4) Unacceptable foodplants

foodplant is hazel, closely followed by birch and hawthorn, and prior to 1974 also wych elm; *E. dilutata* on the other hand, prefers a broken and more open habitat with scattered trees and shrubs. In these conditions *E. christyi* populations drop and almost disappear when half a mile from woodland. However very small numbers still survive, usually as singletons in area (D). Closer proximity to woodland appears to increase this percentage and this can be shown using hawthorn as the only pabulum in the following table:—

	Area (A)	Area (B)	Area (C)	Area (D)
<i>E. DILUTATA</i>	15%	65%	83%	95.5%
<i>E. CHRISTYI</i>	85%	35%	17%	4.5%

Although both species appear to be polyphagous, there is some evidence that *E. dilutata*, certainly in this area of the west midlands, prefers oak (*Quercus* spp.) and as shown in Table (1) & Fig. (6), it is possible that by means of this primary foodplant the species maintains its small but significant woodland population. The natural selective criteria which operate to maintain these disparate populations both inside and outside woodland are not understood. A comparative study of the parasites of the two species was not undertaken in this study.

In area (D) samples were taken from the mechanically clipped hedgerows on the farm and included hawthorn, maple, and common elm. No larvae were found on the last two species and only four were discovered on clipped hawthorn. From this two *E. dilutata* were bred and this represents a 95% reduction in larval population when compared to unclipped hawthorn. The ova of both species are laid on the terminal twigs in October and November. Most of the hedgerows are then cut during the early winter and this reduction in population must be due to this modern technological hedgeclipping revolution which has swept through the whole country in recent years and is certainly widely used in Herefordshire. Fortunately in area (D) 20-30% of the hedgerows are left uncut.

Finally in 1979 a solitary specimen of *E. autumnata* was bred from a hawthorn sample in area (D). This was the only example of this species bred from all the samples over the ten years that the project took to complete, totalling 404 individuals. A few records of this species have occurred at light $\frac{1}{2}$ mile to the east of area (D) for the first time in 1978 & 1979.

In conclusion it should be stressed that the pabula and biotype studies are applicable to this area only. It is very likely that very different results will be found to exist in other areas of the British Isles.

ACKNOWLEDGMENTS

I would like to thank Mr. G. M. Haggett who read the M/S and for his helpful advice; also to Dr. J. R. Langmaid who helped to breed some of the larval samples in 1972.

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PROCEEDINGS

10th January 1980

The President, Rev. D. J. L. AGASSIZ, in the chair.

The President announced with regret the death of a member, A. R. Catlin, resident in Bedfordshire, a dipterist.

EXHIBITS

Dr. A. A. ALLEN — A female *Phthorima compressus* Desvignes (Hym., Ichneumonidae) swept from damp vegetation, 10.viii.78, Bugle, Cornwall. It is considered a rare species and parasitises dipterous larvae, appearing from the pupa. Along with a few others of the Diplazontinae it is remarkable for the very strongly compressed gaster, from 3rd tergite to apex.

A. J. HALSTEAD — (i) a piece of bark collected in late April 1979 from the decaying trunk of a silver birch tree at Cobham, Surrey. At that time there were both adults and larvae of *Megatoma undata* (L.) (Col., Dermestidae) present. The larvae completed their development by the autumn, and some adult beetles could be seen overwintering inside their final larval skin; a number of cast larval skins were also present on the piece of bark. (ii) a male specimen of Blair's shoulder-knot (*Lithophane leautieri hesperica* Boursin (Lep., Noctuidae) caught in a Rothamsted light trap at the Royal Horticultural Society's garden at Wisley, Surrey on the night of 16/17th October 1979, the first record for this site in five years' sampling.

Mrs. MURPHY — A living example of the naturalised scorpion *Euscorpius flavicaudis* DeGeer, probably from Sheppey.

MEMBERSHIP

His name having been read for the second time, I. L. Brydon was declared duly elected. The obligation book was signed by Mr. Rainsford.

ANNOUNCEMENTS

Twenty bound and interleaved copies of the Field Guide at £8/- were now available for members; leaflets about Field Studies Courses were also available for members to collect.

COMMUNICATIONS

With regard to Admiral Torlesse's exhibit of *Cornutiplusia circumflexa* (L.) at the December 13th indoor meeting, Mr. R. F. BRETHERTON said that on the same night as that capture the taking of a specimen of *Hyles euphorbiae* (L.) at Brentford and the record, on the previous night, of many immigrant *Autographa gamma* (L.) in Sussex had now come to his knowledge; these records made it more probable that the *C. circumflexa* was an immigrant rather than an accidental importation.

J. H. P. SANKEY then gave an illustrated talk on the British Harvest-spiders. The audience showed its interest and appreciation by many subsequent questions and applause.

24th January 1980

108th ANNUAL GENERAL MEETING

(with which was combined the Ordinary Meeting)

The President, Rev. D. J. L. AGASSIZ, in the chair.

MEMBERSHIP

The names of A. H. Hayes and I. R. Hudson were read for the second time and they were declared duly elected.

ANNOUNCEMENTS

It was announced that on December 13th no collection for a gratuity to the Alpine Club care-taker was made as it would have been inappropriate at the joint meeting then taking place. A box for contributions for this purpose was therefore circulated.

The Hon. Secretary read the Council's report for 1979 and proposed its adoption, this being seconded by P. Baker. The Hon. Treasurer then circulated and explained the accounts for 1979 and moved their adoption this being seconded by Dr. I Watkinson. The Librarian then read his report and moved its adoption this being seconded by S. N. Jacobs. The Hon. Editor then read his report and proposed its adoption, this being seconded by C. O. Hammond. The Curator then read his report and proposed its adoption, with R. Fairclough as seconder. Col. A. M. Emmet then read the report on the Professor Hering Memorial Fund and moved its adoption this being seconded by M. Chalmers-Hunt. All the above were passed

The following officers were then elected for 1980: President, R. FAIRCLOUGH, F.R.E.S., F.R.H.S. Vice-Presidents: — Rev. D. J. L. AGASSIZ, M.A., and A. E. STUBBS, B.Sc. Treasurer: Col. D. H. STERLING, F.B.C.S. Secretary: E. H. WILD, M.I.Biol. Editor: E. P. WILTSHIRE, C.B.E., F.R.E.S., B.A., M.I.L. Curator: E. S. BRADFORD. Librarian: G. PRIOR, F.L.S., F.R.E.S. Lanternist: — S. A. KNILL-JONES, A.R.C.M. Ordinary members of Council: — Dr. A. A. ALLEN, Ph.D., B.Sc., T. J. DALEY, J. MUGGLETON, P. A. SOKOLOFF, M.Sc., M.I. Biol., M.I.S.T., F.R.E.S. R. S. TUBBS, O.B.E., F.R.I.B.A., F.R.E.S., R. DYKE, G. N. BURTON, B.A., J. M. CHALMERS-HUNT, F.R.E.S., P. J. JEWESS, B.Sc., T. B. LARSEN. The President then delivered his Presidential address after which he inducted the new President in to the chair.

COUNCIL'S REPORT

During the past year the affairs of the Society have continued to run smoothly and much has been achieved.

The membership of the Society is in a healthy state with the election of 55 new members, during this year; ten of our members died during this time, including two honorary and two life members of whom the President will speak later.

The retirement of Mr. John Wakely as Assistant Treasurer was a great loss to Council, who will miss his hard work and dry humour. Our thanks are given to Mr. D. H. Walker who has taken over this important Office, and to Mr. Else who presented his final programme of 20 fascinating indoor meetings. Mr. Muggleton has arranged this year's meetings. Mr. Jackson devised 17 Field Meetings some of which were well supported. We also are grateful to Mr. Bretherton for continuing to look after distributions to members, and to Mr. Prior who has brought his organising talents to bear on the Library.

In spite of problems with our printers the Editor has produced four excellent parts of our Proceedings. We were able to publish the new Field Guide in time for the Exhibition. This involved Col. Emmet and his team in a deal of hard work and Mr. Tubbs in some worried moments with British Rail who threatened to strike at the critical time of delivery. A generous grant and an interest free loan from the Royal Society for this publication were much appreciated. With Country members especially

in mind, Council hopes to publish further books shortly: an illustrated monograph for the identification of Pugs is in preparation.

The Annual Dinner at Imperial College was organised as usual by Dr. MacNulty, and was enjoyed by 75 members and their guests, while the Exhibition, directed by Mr. K. Evans, was an unqualified success, with a fine range of high quality exhibits. To Mrs. Murphy and her team of helpers we are most grateful for the excellent catering arrangements. Thanks are also due to our team of Reporters, to Mr. Wilson for photographing selected exhibits, Mr. Ventom for selling Christmas Cards, Mr. Bradford and Mr. Parker who manned the Sales Dept., and to all others who helped behind the scenes.

A joint meeting with the Royal Entomological Society of London in December when Mr. Bretherton and Dr. Rainey introduced a discussion on Migration in the Northern Hemisphere was a notable success and was followed by a convivial conversazione.

Council regret that, in spite of all efforts, they were unable to reach any satisfactory understanding with the Forestry Commission over the question of permits. These must still be negotiated for by individual members.

The proposed new Commons Bill on Wild Life Conservation has been discussed at length by Council. The Society was represented, at a joint meeting with the N.C.C. and other interested bodies, by the President. We are concerned that that part of the Bill which deals with the protection of habitats should include some areas of interest to entomologists and that too much emphasis is still being placed on the presumed harmful role of the collector in conservation.

HON. SEC.

TREASURER'S REPORT, 1979

You will notice that I have changed the method of presentation of the final accounts this year to the more modern vertical system, and also that I have sub-divided the Publications Account to show separately the cost of publications which are provided to members without charge. The second division of the account shows separately the result of each publication which is produced for sale. I hope that you will find them easier to read this way. All the proceeds from sale of "Illustrated Papers" this year are profits, as the total cost of production was charged against the proceeds of initial sales in 1978. For the "Field Guide" published an increase was now necessary. From the Publications Account you will charging the 1979 accounts with the cost of sales only, carrying the cost of production of unsold copies as an asset.

After holding the subscription rate unchanged for six years, an almost unprecedented feat in these days of inflation, your Council decided that at the end of 1979, I have adopted the normal commercial practice of see that the cost of producing the Proceedings after deducting outside sales was £1,343. About £160 of the distribution costs is applicable to the Proceedings, and the Income and Expenditure Account shows that the general cost of running the Society was £1,287. This gives a total membership cost of £2,790, whilst the subscription income, which showed a most welcome increase over last year of nearly £260, still only amounted to £2,022, leaving a deficit of £768. This was mainly made good by interest not due to be credited to special funds. However, many of the items included in the cost of membership are expected to rise again

next year, the sales of *Proceedings* to outside bodies, cannot be relied upon to continue at the present high level and the interest received is likely to fall, both because some of the accumulated sums which produced it will have been spent and because the continuance of the present high rates of interest cannot be assured. Therefore the increase in the subscription rate was unavoidable.

Subscriptions apart, we have had a very good year. We are most grateful to the Royal Society for a donation of £500 and an interest free loan of £1,000 to assist with the production of the "Field Guide". We are also most grateful to an anonymous member who had contributed to "Moths and Butterflies of Great Britain & Ireland" and told the publishers that he required no payment, but requested them to make a donation to the Society instead.

Our two recent publications have been a financial success, "Illustrated Papers" producing a surplus of £1,067 and "Field Guide" one of £766 in 1979. The former publication is now nearly sold out. So far as possible, it is planned to use the proceeds from the sale of these to finance further publications.

British Entomological and Natural History Society

PUBLICATIONS ACCOUNT FOR 1979

1978	<i>Proceedings</i>	1979
1619.33	Cost of production	1703.03
30.11	Provision shortfall	
<hr/>		
1649.44		
453.57	Less proceeds from sales	359.86
<hr/>		
1195.87	Net cost of <i>Proceedings</i>	1343.17
67.18	<i>Membership List</i>	
<hr/>		
1263.05	<i>Cost of publications supplied free to Members</i>	1343.17
	<i>Illustrated Papers</i>	
981.42	Cost of production	
1569.80	Proceeds from sales	1067.14
<hr/>		
588.38	Profit from sales	1067.14
	<i>Field Guide</i>	
	Cost of production less	
	Royal Society Grant	1667.00
	Less cost of stock on hand	1393.74
	<hr/>	
	Cost of sales	273.26
	Proceeds from sales	1039.24
	<hr/>	
	Profit from sales	765.98
<hr/>		
588.38	<i>Total profit from Special Publications</i>	1833.12
<hr/>		
674.67 Cost	<i>Gross result over all publications</i>	Surplus 489.95
218.36	Cost of distribution	252.72
<hr/>		
£893.03 Cost	<i>Net result to Income and Expenditure Account</i>	Surplus £237.23
<hr/>		

INCOME AND EXPENDITURE ACCOUNT FOR 1979

	<i>Income</i>	
1762.75	Subscriptions	2022.06
	Donations	148.50
732.27	Interest on investments	837.86
	Interest on deposit and	
147.10	P.O. investment account	344.46
29.74	Christmas Card profit	
19.28	Annual dinner surplus	
20.10	Sale of ties profit	61.00
	Net profit on publications	237.23
	Cabinets and collections (net)	175.02
2711.24	<i>Total Income</i>	3826.23
	<i>Expenditure</i>	
533.86	Rent and Insurance	614.68
199.14	Postage and miscellaneous expenses	190.89
98.37	Stationery	208.31
35.75	Subs. to other societies	38.50
30.55	Indoor meetings and exhib. (net)	217.57
10.76	Cabinets and collections (net)	
893.03	Net cost of publications	
	Christmas cards loss	16.01
	Annual dinner loss	1.01
1801.46	<i>Total Expenditure</i>	1286.97
909.78	<i>Excess of income over expenditure</i>	2539.26
	Interest apportioned to Housing	
180.00	Fund	198.00
	Interest apportioned to Library	
40.00	Fund	24.00
	Interest apportioned to Reserve	
220.00	Fund	192.53
440.00	<i>Total apportioned</i>	414.43
	<i>Balance being excess of income</i>	
	<i>over expenditure transferred to</i>	
£469.78	<i>General Fund</i>	£2124.73

BALANCE SHEET AS AT 31st DECEMBER 1979

1978			1979
4393.34	<i>General Fund</i> —Opening balance	4863.12	
	Withdrawn from Reserve (for Field		
	Guide	1667.00	
469.78	Excess of Income over Expenditure	2124.73	
4863.12	<i>General Fund</i> at end of period		8654.85
2108.77	<i>Reserve Fund</i> —Opening balance	2328.77	
220.00	Add interest	192.53	
2328.77		2521.30	
	Less used for purposes reserved	1667.00	
2328.77	<i>Reserve Fund</i> at end of period		854.30
364.32	<i>Library Fund</i> —Opening balance	428.07	
68.75	Add interest and income	53.40	
433.07		481.47	
5.00	Less expenditure	288.90	

428.07	Library Fund at end of period	192.57
1694.19	<i>Housing Fund</i> —Opening balance	1874.19
180.00	Add interest	198.00
1874.19	Housing Fund at end of period	2072.19
2275.92	<i>Hering Memorial Fund</i> —Opening balance	2396.00
223.08	Add interest	325.12
2499.00		2721.12
103.00	Less expenditure	244.55
2396.00	Hering Memorial Fund at end of period	2476.57
£11890.15		£14250.48
<hr/>		
<i>Total Funds</i>		
These funds are represented by:		
	<i>Stock Field Guides</i> at cost	1393.74
(The value of the Society's library, collections, Christmas cards, ties and stocks of other publications is not included in the accounts)		
	<i>Investments at Cost</i> (Details appended)	
7029.85	General Investments	7029.85
1995.96	Hering Memorial Fund Investments	1995.96
9025.81		9025.81
<hr/>		
<i>Liquid Assets</i>		
1066.25	P.O. Savings Investment Account	91.78
1076.48	Debtors and advance payments	662.75
2482.01	Cash on Deposit Account	3288.94
146.55	Cash on Current Account	1444.65
4771.29		5488.12
<hr/>		
	<i>Less</i>	
85.25	Subscriptions paid in advance	262.55
1821.70	Amounts owed and provisions	1394.64
1906.95		1657.19
2864.34	Net liquid assets	3830.93
£11890.15	<i>Total Assets</i>	£14250.48
<hr/>		

AUDITORS' REPORT

In our opinion the annexed Balance Sheet gives a true and fair view of the state of the Society's affairs as at 31st December 1979 and the Income and Expenditure Accounts give a true and fair view of the Society's results for the year.

A. J. PICKLES, F.C.A.

J. L. MESSENGER

*Schedule of Investments at cost as at 31st December 1979**General Investments of the Society*

£112 I.C.I. Ordinary Stock	£260.27
150 Unilever 25p Ordinary Shares	£248.45
843 Prudential Assurance 5p Shares	£712.10
1010 Drayton Premier Investment Trust 25p Ordinary Shares	£1398.21
£455 General Electric 7½% Convertible Stock	£541.58
£800 Agricultural Mortgage Corporation 9¾% Stock 1985-8	£646.49
£1150 Finance for Industry 13% Stock 1981	£1153.71
£1250 Gt. London Council 9½% Stock 1980-82	£1100.14
450 Distillers Ordinary 50p Shares	£708.90
£500 I.M.I. Ordinary Shares	£260.00
	<hr/>
	£7029.85

Hering Memorial Fund Investments

£300 Gt. London Council 9½% Stock 1980-82	£291.97
£800 Agricultural Mortgage Corporation 9¾% Stock 1985-8	£646.48
240 Distillers Ordinary 50p Shares	£303.81
150 Shell Transport Ordinary Shares	£294.04
189 Midland Bank £1 Ordinary Shares	£459.66

TOTAL £1995.96

A review of the Society's investments is currently being carried out and may result in some changes being made this year.

In these days of financial uncertainty, it is difficult to make long term forecasts, but I feel confident that the Society is in a strong financial position to meet whatever problems may arise.

I should like, on behalf of the Society, to thank my predecessor, Mr. Bretherton, both for the excellent work he has done as Treasurer in past years and for continuing with all the work on sale and distribution of our publications. Our thanks are due to Mr. Walker who has taken on the task of looking after the subscription side of the financial work at a particularly onerous time when subscription rates are being changed and to Mr. Wakely who was his predecessor for a number of years. Finally, I should like to thank our honorary auditors for completing their audit in the very short time available.

EDITOR'S REPORT

The 1979 Proceedings, our twelfth volume, were again printed in two double parts, appearing nominally in March and October. Since late last year our printers have been working under difficulties; consequently the first of these issues in fact appeared a month or two late, but the second appeared punctually, making it possible to distribute many copies at the Annual Exhibition and avoid considerable postage costs. Apologies are however due to some authors kept waiting for reprints of their articles, this being also due to our printers' difficulties, from which I am glad to see that they are recovering. The index for Vol. 12 will appear shortly, it is hoped.

These two parts amounted to 140 pages of text and contained ten plates, not to mention the text figures of some articles; in both respects this was an advance on the previous year. More speakers are now providing good abstracts, or even short articles on aspects of their lectures at our indoor meetings, and it is hoped that this growing practice will especially appeal to our country members unable to attend such meetings.

Thanks must go to my assistants and our printers for their part in producing the Proceedings and to all others who have contributed, whether with sectional reports, preparing art work, or writing articles or book reviews. With their aid I think we have managed to maintain a varied and interesting periodical.

LIBRARIAN'S REPORT

This is my first report as Librarian. During the past year certain changes have been made in the Library. All the books have been sorted and placed on the shelves under the headings set out in the Library catalogue. These shelves have been labelled with subjects, and the book cases have also been labelled to show their contents; this it is hoped will enable members to find the books they wish to consult or borrow with minimum delay. Our journals have also been sorted and set out in a similar manner upon the shelves. Following standard library practice, a reference section has been established, this contains books which may not be taken out of the Society Rooms so that they are always available for members to consult. They are important works of reference of which there are duplicate copies on the open shelves. Also following normal library practice I have established a reservation book so that members may be certain of obtaining a book they require as soon as it is returned by another member, or the borrower may be written to if it is overdue.

A new metal bookstack has been purchased and installed; this has provided a seventy-eight foot run of extra shelving space. I am at the present negotiating for the installation of further shelving to take care of recent large acquisitions of books. By sending from four to thirteen years of unbound British journals to the binders we have now almost caught up with the backlog of binding in this area. There still remain large numbers of our foreign journals which are unbound. In my spare time at home I have been able to make loose cases for these and this should prove adequate until the time when we are able to deal with the accumulated backlog in the binding of our foreign material.

It has come to my notice that other Scientific Societies have obtained grants from the British Library, I have therefore commenced negotiations with the British Library to obtain a grant mainly for binding; it is hoped that we shall be successful.

Our thanks are due to Dr. Pike, Mr. Classey, Mr. Wiltshire, Mr. Jacobs, Dr. Bradley, Mr. Tremewan and many others for gifts of books to the Society. I must also say something about the magnificent bequest from our late member Baron C. DeWorms of his entire library. At the moment I am engaged in sorting, labelling and cataloguing this large quantity of books and journals. It contains many fine works that we did not possess, but also duplicates of a great many important books and journals that are in constant demand by our members, this means that these works will now be more readily available to you. For the assistance that they have given and which I hope they will continue to give me, my thanks are due to Mr. Miles, Mr. Bretherton and Mrs. Murphy and not least to Eric Bradford for putting up with an awkward person with whom he has to share room and responsibility below stairs.

CURATOR'S REPORT

The rearrangement of the British butterflies continues. This has proved a task greater than was anticipated because of the general overall deterioration of specimens in the collection. Mr. W. Parker has, I am pleased to report, been able to contact members who will be able to donate specimens to the collection. It is hoped that this will be completed by the end of 1980. Of the other orders, work progresses on the coleoptera and diptera. The re-staging of the microlepidoptera is taking longer than expected.

One Hill unit was purchased during the year. It is to be made available for the Torstenius collection. Various store boxes and other pieces of equipment were bequeathed to the Society by the late C. G. M. DeWorms. The store boxes had to be disposed of quickly, as most were infested with *Anthrenus* larvae, with the consequent threat to the Society's collections. At the Annual Exhibition to the Society's needs, duplicate lepidoptera, a number of store boxes and other oddments were sold off. Once again another fine selection of Scandinavian lepidoptera, presented to the Society by Mr. S. Torstenius, was displayed by Mr. C. B. Ashby. Members may be pleased to know that, to date, sixteen drawers have been completed.

The collections continue to be well consulted. A number of species have been, or are, on loan to those studying particular groups.

During 1979 several members presented species and specimens of lepidoptera to the Society, some not previously in the collection. The thanks of the Society are due to the following for their donation: Mr. B. F. Skinner, Mr. S. N. A. Jacobs, Mr. J. M. Chalmers-Hunt, Mr. E. H. Wild and the late C. G. M. De Worms.

In conclusion I must thank the assistant curators, Mr. C. B. Ashby and Mr. L. Christie for their continued and valuable help.

REPORT ON THE PROFESSOR HERING MEMORIAL RESEARCH FUND FOR 1979

A grant of £50 was made early in the year to the Cambridge University Butterfly Expedition to Central America. This was paid out of the 1978 budget which had not been fully allotted.

Of the applications received for 1979, some had little or no connection with entomology. Only four were given serious consideration and two awards were made. (1) A sum of £150 to Don J. F. Sanchez for research into the leaf-mining insects of the Pyrenees.

(2) A sum of £46 to Mr. E. P. Wiltshire, CBE, to defray the typing and postal expenses incurred for his Revision of the Armadini (Lep., Noctuidae), which was published at a cost of over £800.

The grants made in 1979 were again less than the sum available because of the lack of suitability in the applications. The Committee would therefore welcome an increase in the number of requests, especially if they are concerned with research into leaf-mining insects.

February 14th, 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

The President announced with regret the death of a member, Dr. John L. Newton, a coleopterist.

EXHIBITS

Dr. A. A. ALLEN — Two examples of the Ophioninae (Hym., Ichneumonidae) illustrating very closely related genera. The first, exhibited on behalf of its captor, Mr. D. Sheppard, a female of *Platophion ocellaris* Ulbricht, taken on 22.vii.1877 at Tidenham, Gloucs. This seems to be the second known British record of a very rare species. The second, a female of the very common *Ophion slaviceki* Kriechbaumer was taken at mercury-vapour light on 9.ix.78 at Plaistow, Sussex. Attention was drawn to the form of the scutellum, quadrate in *Platophion* spp. and nearly triangular in *Ophion* spp.

R. FAIRCLOUGH — photographs taken on 30.xi.79 at Liang, Brunei, the first shewing a larval leaf mine on a leaf measuring 18" by 15".

A. J. HALSTEAD — Adults of *Xyloterus domesticum* L. (Col., Scolytidae) collected on 9.i. 80 at Wisley, Surrey. The beetles emerged from silver birch logs brought indoors as firewood. A log with an exposed tunnel was also shewn. The tunnels of this beetle run horizontally with larval chambers above and below the main tunnel, approximately alternately. The full tunnel system is Y-shaped, beginning with a short passage dividing into two branches in which the grubs are raised. *X. domesticum* also breeds in the wood of other kinds of deciduous trees, such as beech and oak.

MEMBERSHIP

The Obligation Book was signed by Mr. Ian Brydon.

COMMUNICATIONS

R. FAIRCLOUGH reported numerous spring geometrid moths being seen to light on the 10th February at his house in Leigh, Surrey.

A. E. STUBBS stated that the new Wildlife Bill was now unlikely to come up for discussion in Parliament before November 1980.

Dr. J. WAAGE then gave a fascinating illustrated talk on sloths and moths; see article on p. 73.

28th February 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

EXHIBITS

M. R. BROWN — Larvae of *Noctua orbona* (Hufn.) (Lep., Noctuidae), found on February 15th in the Breck district near Bury St. Edmunds, and other undetermined larvae. He found about 50 *orbona* in a few hours in one place; however there was a 50% loss by parasitisation.

MEMBERSHIP

Their names having been read a second time, the following were duly declared elected members: — Miss A. Watts & Messrs. A.C. Johnson, A. Enfield, M.Sc., F.R.E.S., R. J. Burnett & R. M. Akehurst.

COMMUNICATIONS

G. PRIOR reported the capture indoors of the first pug of the year

(*Gymnoscelis rufifasciata* (Haw.) on February 16th.

Dr. P. J. L. ROCHE and Mr. M. TWEEDIE then gave an illustrated lecture on "A small Pyrenaean valley and its inhabitants". The habitat and its insects were, as expected, well illustrated and the audience were invited to pursue the study of this habitat, and the naming of its fauna, though mere butterfly collecting there would not be encouraged. The actual locality in question was a side valley at St. Julien, Andorra, where one of the lecturers resided in a flat not well situated for moth catching. The lecturers were warmly applauded for their interesting exposition.

March 13th, 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

EXHIBITS

Rev. D. J. L. AGASSIZ — A further British specimen of *Agonopterix prostratella* (Const.) (Lep. Oecophoridae), taken at Swange, 21 September 1970 and hitherto misidentified as *A. pallorella* (Z.). Certain other facts suggest that this species is resident in England, although the only previous record is one specimen taken by R. Fairclough in Ashdown Forest in 1957. For examination of the ♀ genitalia dissected, described and figured by Pierce as *pallorella* shows that this too is in fact *prostratella*; its data have not yet been ascertained. On the Continent it is said to feed on *Genista prostrata*, which does not occur here, but it probably feeds on a related plant.

Dr. A. A. ALLEN — (i) A ♀ specimen of *Colastes braconius* Haliday (Hym., Braconidae) bred 20.ii.1980 from a larva of *Phyllonorycter nigrescentella* (Logan) (Lep., Gracillariidae). The host was one of several obtained in leaves of *Vicia sepium* 28.x.1979 in Darenth Wood, Kent, on a Society field-meeting. Though known as a common parasite on other *Phyllonorycter* species, this was thought to be its first recorded occurrence on *P. nigrescentella*. (ii) a ♀ specimen of *Theobaldia annulata* Schrank (Dipt., Culicidae) taken in a lighted room at Reigate, Surrey, 11.iii.1980. Known to hibernate and occasionally fly during the winter in mild weather this example of the mosquito was in exceptionally good condition. (iii) three larvae of *Campaea margaritata* (L.) (Lep., Geometridae) feeding on wild privet from which they were beaten on 2.iii. 1980 in a local wood at Salfords, Surrey.

MEMBERSHIP

The Obligation Book was signed by Mr. Henshaw.

Dr. R BAKER then gave an illustrated lecture on celestial and light trap orientation of moths. This described observations and experiments and the conclusions the speaker drew from them. Moth migration, in the sense of cross-country movement, is a commonplace. Although some species travel thousands of kilometres, most probably travel much shorter distances. All migrants, however, are faced with problems of orientation. The large yellow underwing, *Noctua pronuba* (L.), has been studied using tethered but flying moths in light winds out of doors. When the moon is visible, this species orientates by it, but does not compensate for its apparent movement across the sky. When the moon is not visible, but the sky is clear, the species orientates to visual, dorsal objects that move across the sky at about 16°/h. Stars near the celestial equator are impli-

cated. Radar evidence suggests that orientation also occurs on overcast nights, but the cues used have not been investigated. Large yellow underwing individuals adopt the same angle of orientation to an artificial light source, as on a light trap, as they do to the moon. Distance of response to an artificial light source near ground level is about 3 metres (125 watt MV lamp). Distance increases to about 13 metres when the lamp is 9 metres above ground level. This is the distance at which the lamp subtends the same angle to a point as the vertical diameter of the moon as viewed from Earth. The short-distance nature of the light trap response at temperatures of 15°C or below has major implications for the use of light-traps in the sampling of moth populations. Potential use for research on the flight paths of migrating moths is also involved. This was followed by an animated discussion which proceeded for longer than the actual talk, a sign of the interest the speaker had evoked in those present.

27th March 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

The President announced the death of a member, F. M. Struthers who joined the Society in 1948.

EXHIBITS

Dr. A. A. ALLEN — A female *Pimpla spuria* Gravenhorst (Hym., Ichneumonidae), bred 4.iii.80 from a pupa found in a dead umbellifera stem, 10.xi.79 at Littlehampton, Sussex. The literature states that this species may be obtained by collecting pupae of the genera *Agonopterix* and *Depressaria* (Lep., Oecophoridae) in the autumn. The record is of interest for it indicates that the parasite overwinters in the host pupa rather than emerging in the autumn and hibernating as an adult.

E. S. BRADFORD — an example of the Strepsiptera from dead wood found on the ground at East Blean, Kent.

R. FAIRCLOUGH — a box of green moths of different families collected in Brunei last winter, including the hawk-moth *Rhychalaba acteus* (Cramer).

MEMBERSHIP

Their names having been read for the second time the following were declared duly elected: — Prof. L. Annable, A. A. Alexander, M. J. Percival, and P. M. Siddons.

Messrs. A. H. Hayes, A. M. Hudson and P. G. Farwell signed the Obligation Book.

COMMUNICATIONS

Rev. D. J. AGASSIZ referring to the last minutes stated that the data of Pierce's example of *Agonopterix prostratella* (Const.) were still unknown.

Other members reported recent captures of lepidoptera and compared results.

Dr. J. DRANSFIELD then gave an illustrated lecture on "Plants and animals in Malaysia, Borneo, Sumatra, Java, Saba and the Philippines", which in fact concentrated on the orchid genus *Corybas* Salisb. and also pitcher plants (*Nepenthes* (L.)). Unanswered questions regarding the former were: the functions of the long whisker-like filaments, and whether fungus-gnats pollinated them, as suggested. The subjects of forest clearance and erosion were also ventilated. There were also good illustrations of various creatures including some insects. The lecture was enthusiastically applauded.

10th April 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

EXHIBITS

Col. A. M. EMMET (on behalf of P. J. JOHNSON): a small case of an unidentified *Coleophora* sp., one of six found in the seed-head of a bulrush (*Typha latifolia*) also containing larvae of *Limnoecia phragmitella* Stainton (not exhibited) collected at Nuneham Courtney besides the Thames in mid-March; members were invited to suggest the identity, as no *Coleophora* sp. was known to feed on *Typha* [For a suggestion, see below, and under the next meeting.]

P. A. SOKOLOFF — larvae of *Tineola bisselliella* (Hummel) feeding on woven wool, showing the extensive damage these clothes-moths larvae can cause. Reared from a female kindly given by Dr. I. Watkinson.

COMMUNICATIONS

The first sighting of *Polygonia c-album* (L.) in Kent on the 9th and in Hants on the 3rd of April was reported by M. Chalmers-Hunt and Col. Sterling respectively; E. H. Wild reported seeing the first *Pieris rapae* (L.) at Croydon on the 10th. R. F. Bretherton stated that, after ten cold clear nights unfavourable to moths, the night of 9th/10th was surprisingly favourable, and he had found 224 moths in his trap this morning, of which 210 were common *Orthosia* and one *O. miniosa* (D. & S.) was seen. It was again a cool, clear night and he had found that this predominance of Noctuids over Geometrids usually occurred on such nights; the Geos came to light more freely on mild nights. Why, he asked, should this be so? A discussion ensued in which various possible explanations were proposed by different members. Geometrids, several said, entered traps less willingly, or were able to escape after entry more easily. The Skinner or Holroyd trap, another member suggested, was better than the Robinson for attracting and holding Geos. The latter was too shallow, according to D. J. Agassiz, who had found Geos were able to escape before daylight. It was suggested that a deeper version of the Robinson trap retained moths better, especially Geos. E. P. Wiltshire, speculated on whether the Noctuids with stronger thoracic muscles than Geos on the whole were able to warm up and fly more readily on cool nights, if in fact the observation of Geos flying to traps mainly on mild nights, was confirmed.

The scheduled speaker having cancelled his lecture, a slide evening was held, at which K. EVANS first showed some photos of chironomid swarms over trees in the Thames valley, and the lanternist showed some of the society's own collection of slides, mainly excellent ones of early stages, of lepidoptera, which had been presented by members.

OBSERVATIONS ON EXHIBITS

M. Chalmers-Hunt suggested that a *Juncus*-feeding *Coleophora* might prove to be the identification of the enigmatic cases in the *Typha* seed-head of Col. A. M. Emmet, to wit *C. caespitiella* Z. (= *agrammella* Wood); however the exhibitor replied that in that case the descriptions of the *caespitiella*-case in books did not agree.

April 24th, 1980

The President, R. F. FAIRCLOUGH, in the chair.

EXHIBITS

Col. A. M. EMMETT—Distribution maps of the Psychidae occurring in the Epping Forest area of Essex, showing their decline which is attributable to atmospheric pollution.

Dr. A. A. ALLEN—A specimen of *Dicaelotus pictus* (Schmiedeknecht) (Hym: Ichneumonidae) swept from roadside by sea at Shaldon, Devon 14.iv.1980. The species belongs to the tribe Phaeognini of the Ichneumonidae, all of which are believed to be exclusively parasitic on mature larvae of microlepidoptera. *D. pictus* is considered rare, although its small size may lead to it being overlooked. Also exhibited were some larvae recently taken in South Devon: *Euplagia quadripunctaria* Poda (Arctiidae), four of which were found by searching cliffs at night at Dawlish. Two were found on bramble and two on *Urtica*. The larvae were more advanced than those found in the previous two years at the same time, reflecting the mild winter and spring. On a different part of the restricted area accessible on the cliffs were found several larvae of *Callimorpha dominula* L. Finally some larvae of *Pseudopternina pruinata* Hufn., all of which were swept from *Ulex* 13.iv.1980 on Haldon Moors in the areas damaged by fires in 1976.

P. A. SOKOLOFF—Larvae of the marsh fritillary, *Euphydryas aurinia* Rott., feeding on garden honeysuckle. The strain had been bred in captivity for some years.

MATTERS ARISING FROM MINUTES

Col. Emmet stated that the cases reported at the previous meeting on *Typha* were probably *Coleophora caespitiella* Zell. The Locality was revealed as an ex. MOD site now owned by Oxford University at Newnham Courtney. Cases extracted by Mr. P. Johnson had all returned to the seedheads.

MEMBERSHIP

Mr. A. Paton Foster B.Sc., A.R.C.S., was elected to membership.

ANNOUNCEMENTS

The Secretary announced that the late Baron deWorms had left the sum of £500 to the Society, in addition to his magnificent bequest of books.

COMMUNICATIONS

E. H. WILD reported that he had taken a wholly melanic specimen of *Lycia hirtaria* (Clerck) in his Selsdon trap. Mr. Bretherton reported that an MV trap run on the Kent Sussex border on 15th April had attracted 675 moths. These represented 25 species including two examples of *Acleris literana* (L.). The President commented on the scarcity of *A. literana*, and stated that, in his experience, females of *literana* laid fewer eggs than *cristana*. Mr. Chalmers-Hunt reported sightings of *Vanessa atalanta* L. during early April from Essex and London. Mr. Bretherton reported that a small migration had already occurred this year. At Peacehaven in Sussex examples of *Heliothis peltigera* (D. & S.), *Agrotis ipsilon* (Hufn.), *Nomophila noctuella* (D. & S.) and *Cynthia cardui* (L.) had already been noted.

Dr. D. HAWKSWORTH then gave a lecture entitled "Lichens as pollution monitors". This illustrated talk described the effect of airborne pollution.

particularly by fluorides and sulphur dioxide on the lichen flora. Whilst many species were intolerant of pollution, one or two species were increasing their range. Detailed study of the distribution and diversity of lichen species had proved a good index of the degree of airborne pollution. The lichen flora of Epping Forest had declined dramatically over the past two hundred years, an observation that correlated well with the earlier exhibit of Col. Emmet. The talk stimulated many questions, and Mr. M. Brown observed that the other group of lichen feeders, the *Lithosiinae*, had also declined in Essex.

May 8th, 1980

Combined Special and Ordinary Meeting

The President, Mr. R. F. FAIRCLOUGH, in the chair.

The President explained that the special meeting was in order to discuss a proposal, already circulated, under bye-law 26. The following proposal was therefore put to the meeting, having been proposed by the Council, the Hon. Treasurer, Col. D. H. Sterling, proposing and J. M. Chalmers-Hunt seconding:—

“As from 1st January 1981, paragraph 2 of the Regulations governing the Housing Fund shall be deleted, and the following substituted:

2. The income shall be used towards defraying the cost of rented premises or, if not required for that purpose, shall be accumulated until the fund is expended or 31st December 2000, whichever is the earlier, and such accumulations shall be an increment to capital.”

The Treasurer, when proposing, explained that the Housing Fund was started in 1960 to be used in or towards the purchase of freehold or leasehold (not less than 40 years unexpired) land or premises for the headquarters of the Society. The Regulations required that a special meeting should be held in 1980, if the fund had not by then been used for its purpose, to decide on the use to which further income should be put. The Fund now stood at slightly over £2,000/- and there was little prospect of achieving its aim in the foreseeable future. The Council considered that the interest on the accumulated donation, transfers, etc. would be more usefully employed if helping to pay the rent of the premises at present occupied.

The motion was carried *nem. con.*, there being more than twenty members present.

EXHIBITS

A. M. Emmet — two rare species of Nepticulidae from Essex,

(a) *Stigmella minusculella* (Herrich-Schäffer). Two specimens reared from *Pyrus communis* on the 13th and 14th of April, 1980. The mines were collected on the 10th of September, 1979 in north-east Essex. It is believed that these are the first British specimens for 50 years.

(b) *Stigmella samiatella* (Zeller). One reared from *Quercus* on the 16th of April, 1980. The mine was collected at Great Holland in north-east Essex on the 7th of October, 1979. It is the third British example, the first, also from Essex, having been reared by W. C. Boyd in 1900 from a mine collected at Danbury. The species is common on the Continent and it is possible that it may prove to be well established in eastern Essex. Male specimens of the other black-headed oak-feeding nepticulids viz. *S. atricapitella* (Haworth), *S. ruficapitella* (Haworth) and *S. basiguttella* (Heinemann) were shown for comparison, together with sketches illustrating the distinguishing characters.

(c) Larval spinnings of *Caryocolum viscariella* (Stainton) on *Silene dioica*. They were collected on the 4th of May, 1980 near Matching in western Essex. The only previous record from Essex is of one reared from Benfleet in 1938 by the late Stanley Wakely and confirmed by dissection by Dr. K. Sattler. The species is rare throughout its range in Britain and has hitherto been found mainly in the north of England.

R. F. FAIRCLOUGH—Live specimens of *Eupithecia fraxinata* Crewe bred from sea-buckthorn at Camber, E. Sussex; of *Eriopsela quadrana* (Hbn.) bred from golden-rod, larvae collected 4.vii.79 at Arnside, Westmorland, and of *Argyresthia mendica* (Haw.) bred incidentally from stems on which *Acleris cristana* (D. & S.) had oviposited.

COMMUNICATIONS

E. H. Wild stated that an example of *Aethes francillona* (F.) had been observed resting by day tucked into the corner of a post on which he had been searching for Psychid sack-cases.

Other members reported various early appearances of migrants. E. S. BRADFORD reported having seen, all within a few minutes, in a Kent wood a willow-warbler, a pied fly-catcher and a nightingale; also, exposed to the elements on the topmost part of his roof, an example of *Dichonia areola* (Esp.). Mr. Tubbs reported that the willow-warbler had been noted this year as early as April 3rd since then, perhaps on account of the colder weather, an interval had occurred during which it was not reported.

E. CLASSEY reported an outbreak of *Callimorpha dominula* (L.) larvae which had devastated comfrey over a small area of about an acre near Faringdon, but the species was not seen in near-by alternative sites.

Mrs. MURPHY then gave an illustrated talk on "Spider hunting in Malaya and Borneo". The slides were much admired and many subsequent questions showed the audience's interest in her trip to the tropical Far East.

22nd May, 1980

The President announced the deaths of three lepidopterist members: Mr. T. W. Jefferson, Mr. C. Keith-Johnston and Mr. Peter Rogers.

EXHIBITS

Dr. A. A. ALLEN—A ♂ specimen of *Apanteles parallelus* Lyle (*Braconidae*) bred 17.v.80 from a larva of *Hemithea aestivaria* (Hüb.) from Littlehampton, Sussex, one of four larvae found on *Prunus spinosa*; the host larva had not died until 12 days after the emergence of the parasite larva. Also a ♂ specimen of *Microplitis fordii* Nixon, bred 11.v.80 from a larva of *Euclidia mi* Clerck on *Vicia* from Salfords, Surrey.

Col. A. M. EMMET—Three specimens of "*Stigmella nanivora*" (Petersen) reared from mines on *Betula nana*. These were collected by the Rev. D. J. L. Agassiz on 17.ix.79 on high ground at Alvie, Inverness-shire, the adults emerging 23-30.iv.80. Specimens of *S. betulicola* (Stainton) from Surrey and Ireland were shown for comparison. Opinion on the Continent is divided on whether "*nanivora*" is a distinct species or a form of *betulicola*; on the evidence of the moths exhibited, the latter seems more likely to be correct.

A larval spinning of *Batrachedra pinicolella* (Zeller) on *Picea abies* from Rowney Wood in N. W. Essex. When the *Field Guide* was written, no one approached had observed the feeding of this species and Ford's description was followed. It is suggested that this should now be emended

to read under "L.", "Mining the needles from a silken gallery covered with pale yellowish or reddish brown frass, spun on the surface of a twig." Meyrick's description of the larva also needs modification: this reads "larva reddish brown; head black; plate of 2 black, anterior edge white." The larva is, in fact, pale brownish drab and it is not the anterior edge of the prothoracic plate, but the epidermis between that and the head capsule, which is white. A spinning of *Epinotia nanana* (Treits.) on the same foodplant was shown for comparison. The main difference is that the frass is deposited in the previously mined leaf and not used to cover the spinning.

E. H. WILD — A melanic form of *Lycia hirtaria* Clerck taken at M.V. at Selsdon, Surrey, 17.iv.80. Kettlewell lists three named melanic forms: — f. *nigra* Cockayne, a recessive only from London and Essex. f. *fumaria* Haw. More widespread. f. *hannoviensis* Malan. Europe. There is another melanic f. *borealis* Toll from Poland. The form exhibited looks phenotypically different from both *nigra* and *fumaria*, though of course its genetics are unknown.

C. O. HAMMOND — A colour illustration of the world's largest dragonfly — the damselfly *Megaloprepus coerulatus* from Ecuador (wingspan 150 mm.). The delicate wing venation and legbristles do not lend themselves to four-colour reproduction so that line drawings would be preferable for insects of this type.

Dr. J. R. LANGMAID — Larvae of *Semioscopis evellanella* (Hübner) from Aviemore. The larvae make silken tubes in a folded edge of a leaf of birch.

A. E. STUBBS — Two recently bred craneflies: (a) *Limonia ornata* (Meigen); the species is normally found on butterbur, but there appears to be no rearing record to prove the association. A search of decaying leaf petioles of butterbur at Midger Wood, Glos. in October 1979 yielded *Limonia* larvae which are currently producing *ornata* adults. (b) *Gnophomyia viridipennis* (Gimmerthal), a very local medium-sized black cranefly, usually found about dead poplars. Larvae and pupae collected on 18th May from a black poplar log at Woodwalton Fen, Hunts. have produced adults of this species.

R. F. FAIRCLOUGH — (a) A live specimen of *Cyphostethus tristriatus* (Fabr.) who found the bug on juniper on Stockbridge Down, Hants, the juniper shield-bug, brought to the meeting for identification. (b) a live adult of *Cydia pallifrontana* (L. & Z.) with a piece of rotten wood showing pupa cases; from larvae collected in Kent 11.viii.79. These overwintered as larvae and while some pupated in their hibernating sites in tissues, others wandered about but accepted the wood, as suggested in the *Field Guide*.

Rev. D. J. L. AGASSIZ — (a) a live adult of *Aethes williana* (Brahm) from Grays, Essex. (b) Photographs of Pugs and paintings of larvae by Haggett, shortly to be printed for inclusion in the Society's forthcoming publications.

Arising from the minutes of the previous meeting, Col. Emmet remarked on the remarkable spread of *Caryocolum viscariella* (Staint.) in 1980, and showed a map of Essex showing its occurrence in twenty-one 10-km. squares in addition to the one previous record of the late S. Wakely in 1938. In some of the localities it has been looked for without success in previous years.

MEMBERSHIP

The following were read for the second time and declared elected:
P. I. Sidall, S. A. Manning and R. G. Warren.

COMMUNICATIONS

Dr. J. LANGMAID reported that he had collected small green larvae on elm in September 1979, belonging to the species *Pleuroptya ruralis* (Scop.) which transferred to nettle after hibernation. Their pre-hibernation habits had little been known.

Mr. G. PRIOR reported on using the beating tray of the late Dr. C. G. M. de Worms. After invoking the departed spirit of the late Baron, he was rewarded with amazing success – ten larvae of *Chloroclystis chloerata* Mab. at a single stroke at Boars' Hill, Berks.!

J. M. CHALMERS-HUNT reported that *Lycaena phlaeas* (L.) the small copper, was abundant at Dungeness, also *Pyrgus malvae* (L.), the grizzled skipper, on 17.v.80; A holly blue, *Celastrinus argiolus* (L.) had been reported as early as 21st April in Gwent. He also reported finding a melanic *Ematurga atomaria* (L.) on chalk.

M. VENTOM reported seeing an orange tip (*Euchloe cardamines* (L.)) at Hampstead, and Col. EMMET commented on its abundance this year.

A HAYES remarked on a bamboo flowering profusely in Essex. It was stated that such flowering was followed by death.

B. H. HARLEY then introduced a discussion on the relative merits of photography and art-work in entomological illustration. He began by showing some slides illustrating the different uses of art and photography, tracing their history. There then followed a lively discussion concluded by Mr. C. O. HAMMOND showing from his work the different advantages and disadvantages of the two media. Mr. Harley was thanked by all for his introduction.

FIELD MEETINGS

WALBERSWICK — SOUTHWOLD — DUNWICH AREA, SUFFOLK

30th June — 1st July 1979

Leader — H. E. CHIPPERFIELD

Seven members and one visitor met at the leader's bungalow at Walberswick for this meeting. Because of an obstruction to the passage of cars to the marshes at Walberswick it was decided to split the party and MV lights were run on Southwold beach, Dunwich beach bordering the marsh, and the edge of Dunwich forest.

A total of 88 species of macro-lepidoptera was recorded, the more interesting being:—

SOUTHWOLD BEACH:— *Sideridis albicolon* (Hübner), *Mythimna litoralis* (Curt.), *Photodes elymi* (Treits).

DUNWICH BEACH:— *Spilosoma urticae* (Esp.), *Lacanobia suasa* (D. & S.), *Mythimna pudorina* (D. & S.), *Chilodes maritima* (Tausch).

DUNWICH FOREST:— *Hyloicus pinastri* (L.), *Ptilodontella cucullina* (D. & S.), *Diacrisia sannio* (L.), *Perconia strigtlaria* (Hübner).

DARENTH WOOD, KENT — (October 28th 1979)

Leaders — Dr. I. A. WATKINSON & J. M. CHALMERS-HUNT

The main objective of this meeting was to carry out a little detective work in the hope of discovering more about a species of *Phyllonorycter*. The late Stan Wakely had taken some specimens of this genus which have been placed under *P. blancardella* (Fabr.) in his collection at Cambridge. These specimens were labelled Darenth, May 1954 but were clearly not *P. blancardella* being most like a new sub-species described from Bohemia by Povolny and Gregor as *P. cavella* ssp. *milleri*. Genitalia preparations confirmed this identity but this sub-species has only been recorded from *Prunus cerasus*, a shrub which does not occur in Darenth or the immediate area. Entomologists who attended the field meeting were supplied with copies of the paper on *P. cavella* ssp. *milleri*. and were requested to collect *Phyllonorycter* mines from as many plant species as possible, particularly from plants in the Family *Rosaceae* in the hope of finding the British foodplant of this species.

About twenty people attended this traditional post-exhibition meeting, which was also arranged as a joint occasion with the Kent Field Club. Members of both societies were present as well as Messieurs De Prins and Henerickx from Belgium. Other visitors from Belgium missed their train from London and eventually arrived at Longfield where they were to spend their day successfully collecting mines of the genus *Phyllonorycter*, *P. nigrescentella* (Tog.) proving particularly common there.

The day itself dawned cold and very foggy, but had improved slightly by the time of the meeting. It did however remain misty and very cold throughout the day, but the total absence of even a slight breeze made the searching for mines a very much easier process. Mines were very plentiful and many were collected particularly on crab-apple and on birch. Over 100 species were recorded and the list given below represents both those positively identified at the time as well as those subsequently identified by rearing as adults. Of special note are two species, *Leioptilus lienigianus* (Zell.), of which one small larva was found believed to be the first ever found in the autumn, and *P. cydoniella* (D. & S.) a very local species which was abundant on crab-apple and when reared showed very little parasitism. Unfortunately no *P. cavella* ssp. *milleri* were subsequently reared from any of the leaves collected.

The following is a complete list of the species recorded, almost all of which were observed or collected as mines on their respective foodplants: —

NEPTICULIDAE

Ectodemia argyropeza (Zell.), *E. intimella* (Zell.), *E. agrimoniae* (Frey.), *E. angulifasciella* (Staint.), *E. atricollis* (Staint.), *E. argentipedella* (Zell.), *E. albifasciella* (Hein.), *E. subbinaculella* (Haw.), *E. heringi* (Toll), *E. pulverosella* (Staint.), *Fomoria septembrella* (Staint.), *Trifurcula immundella* (Zell.), *Stigmella aurella* (Fabr.), *S. aeneofasciella* (Herr.-Schäff), *S. gei* (Wocke), *S. dulcella* (Hein.), *S. marginicolella* (Staint.), *S. continuella* (Staint.), *S. plagicolella* (Staint.), *S. salicis* (Staint.), *S. obliquella* (Hein.), *S. floslactella* (Haw.), *S. pomella* (Vaugh.), *S. perpygmaeella* (Haw.), *S. ulmivora* (Fol.), *S. atricapitella* (Haw.), *S. ruficapitella* (Haw.), *S. basiguttella* (Hein.), *S. anomelella* (Goeze), *S. viscerella* (Staint.), *S. malella* (Staint.), *S. hybnerella* (Hübner), *S. oxyacanthella* (Staint.), *S. crataegella* (Klim.), *S. microtheriella* (Staint.), *S. luteella* (Staint.), *S. distinguenda* (Hein.), *S. confusella* (Wood).

TISCHERIIDAE

Tischeria ekebladella (Bjerk.), *T. marginea* (Haw.).

INCURVARIIDAE

Phylloporia bistrigella (Haw.), *Heliozela sericiella* (Haw.), *H. hammoniella* (Sorh.),

PSYCHIDAE

Narycia monilifera (Geoffr.), *Psyche casta* (Pall.).

LYONETIIDAE

Leucoptera laburnella (Staint.), *L. spartifoliella* (Hübner), *Lyonetia clerkella* (Linn.), *Bucculatrix albedinella* (Zell.), *B. frangulella* (Goeze), *B. ulmella* (Zell.), *Bedellia somnulentella* (Zell.).

GRACILARIIDAE

Caloptilia betulicola (Her.), *C. alchimiella* (Scop.) / *robustella* Jäckh, *C. stigmatella* (Fabr.), *C. syringella* (Fabr.), *Parornix betulae* (Staint.), *P. anglicella* (Staint.), *P. devoniella* (Staint.), *P. scoticella* (Staint.), *P. finitimella* (Zell.) / *torquillella* (Zell.), *Callist denticulella* (Thunb.), *Leucospilapteryx omissella* (Staint.), *Phyllonorycter messaniella* (Zell.), *P. harrisella* (Linn.), *P. heegeriella* (Zell.), *P. quercifoliella* (Zell.), *P. oxyacanthae* (Frey), *P. sorbi* (Frey), *P. pomonella* (Zell.), *P. blancardella* (Fabr.), *P. cydoniella* (D. & S.), *P. cerasicolella* (Herr.-Schäff.), *P. lantanella* (Schränk), *P. corylifoliella* (Hübner), *P. coryli* (Nic.), *P. solicicolella* (Sirc.), *P. dubitella* (Herr.-Schäff.), *P. quinната* (Geoffr.), *P. nigrescentella* (Logan), *P. lautella* (Zell.), *P. tristigella* (Haw.), *P. schreberella* (Fabr.), *P. nicellii* (Staint.), *P. ulmifoliella* (Hübner), *P. trifasciella* (Haw.), *P. sylvella* (Haw.).

SCHRECKENSTEINIIDAE

Schreckensteinia festaliella (Hübner).

COLEOPHORIDAE

Coleophora gryphipennella (Hübner), *C. serratella* (Linn.), *C. limosipennella* (Dup.), *C. lineola* (Haw.), *C. discordella* Zell., *C. squamosella* Staint., *C. argentula* (Steph.), *C. virgaureae* Staint., *C. artemisicolella* Bruand.

ELACHISTIDAE

Elachista megerlella (Hübner), *E. gangabella* Zell.

MOMPHIDAE

Mompha raschkiella (Zell.).

TORTRICIDAE

Acleris schalleriana (Linn.), *Acleris boscana* (Fabr.), *Pammene fasciana* (Linn.).

OECOPHORIDAE

Diurnea phryganella (Hübner), *D. fagella* (D. & S.).

GELECHIIDAE

Reuttia subocella (Steph.).

PTEROPHORIDAE

Emmelina monodactyla (Linn.), *Leioptilus lienigianus* (Zell.).

COCHYLIDAE

Aethes smeathmanniana (Fabr.).

THE SOCIETY'S PUBLICATIONS

AN IDENTIFICATION GUIDE TO THE BRITISH PUGS.

The Society announces the publication of this booklet in the late autumn of 1980, and it is hoped that it will be in time for the Annual Exhibition.

Written by a group of members, the booklet comprises four superb colour plates featuring photographs of every species and form known from the British Isles of the genera *Eupithecia*, *Chloroclystis*, *Gymnoscelis* and *Anticollis*; a short description of each species; a key to all known forms; a survey of non-British species which might occur here; a bibliography; and line drawings of the genitalia of both sexes including male abdominal plates.

The text and plates together will amount to about 50 pages and it will be bound in a stiff paper cover not unlike our Proceedings to which it forms an optional supplement.

Price: £4.50, £3/- to members of the Society, postage 25p extra. Orders enclosing cheques should be sent to the Honorary Distribution Secretary, R. F. Bretherton, Esq., C.B., F.R.E.S., etc., Folly Hill, Birtley Green, Bramley, Surrey.

A FIELD GUIDE TO THE SMALLER BRITISH LEPIDOPTERA

The Society also announces that the above important and entirely new work, bringing up to date and uniting the well-known Guide by the late L. T. Ford, B.A., and the Supplement, both hitherto advertised on this page, with much additional matter, published last autumn, is still available, price £9, £6 to members, postage 60p extra. Bound in stiff paper cover. A few bound and interleaved copies are also obtainable at £8, by members.

A LEPIDOPTERIST'S HANDBOOK

The Amateur Entomologist's Society is pleased to announce the publication of its latest Handbook, written by Richard Dickson. It is intended as a 'vade mecum' for both beginners and initiated lepidopterists and deals with all aspects of the subject in a series of eleven chapters and four appendices. There are 34 line illustrations and 13 photographs to augment the text and the binding has been sewen to meet constant use.

It is a practical book on the various facets of breeding, collecting, storing, conservation and photography of lepidoptera and should appeal to most lepidopterist. Although the various techniques relate to the British fauna, most are valid for lepidopterists anywhere.

The price is £3.00 plus postage and is available from A.E.S. Publication Agent, 137 Gleneldon Road, London, SW16 2BQ. (An invoice will be sent with orders, including postage).

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MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place 1st November, in Chelsea Old Town Hall.

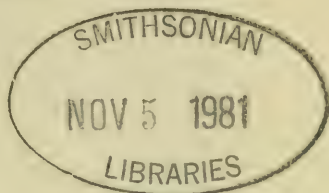
Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings.

The current Programme Card can be had on application to the Secretary.

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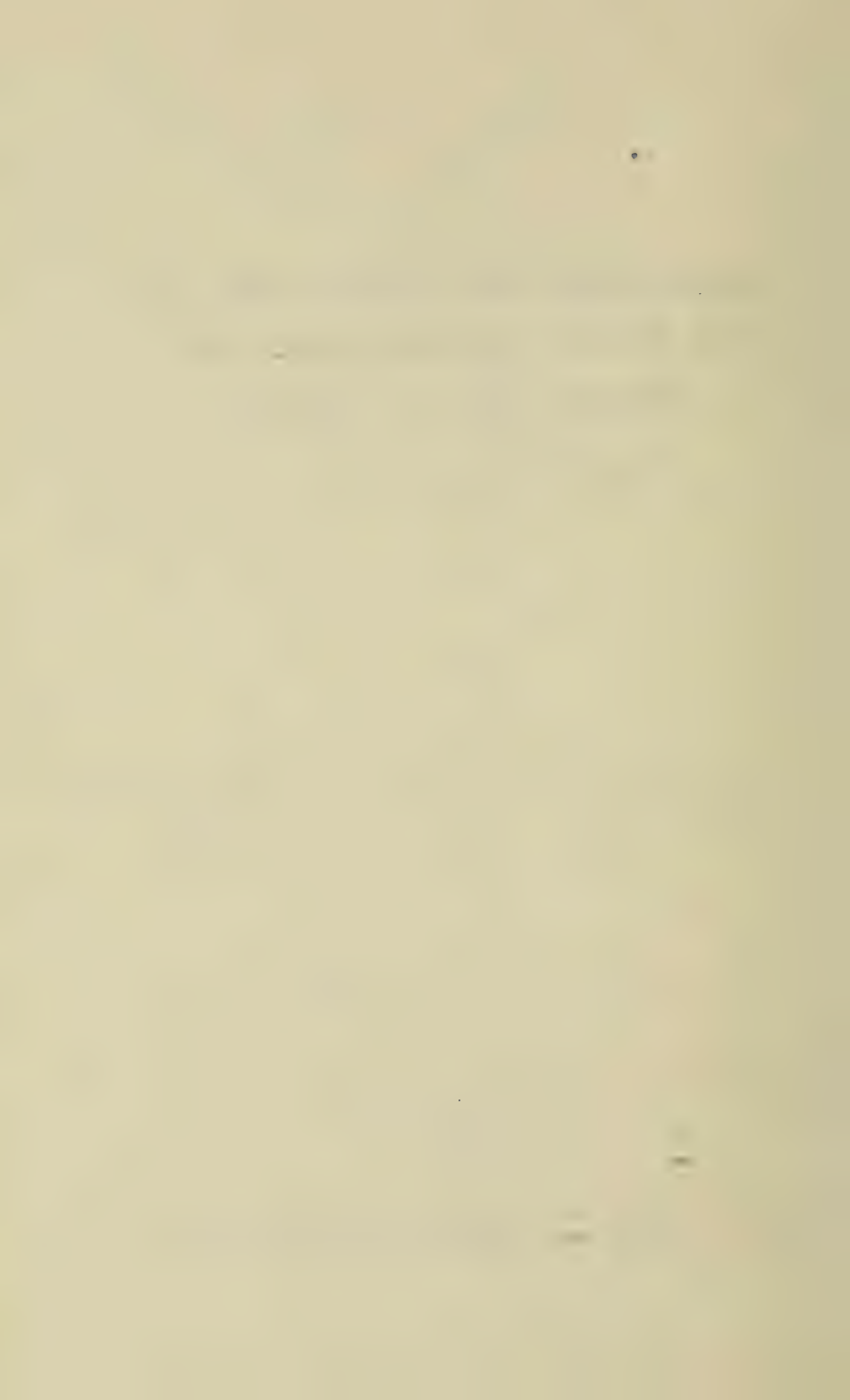
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UNDER NEW MANAGEMENT?

Your editor since volume 9, Ted Wiltshire, retired from the scene of verbal battle at the end of 1980, scarred by an attack of shingles. I am relieved to report that he is making a good recovery. I have bubbled up from 21 years spent stirring the muddy waters of the editorial panel with my red pen, so my eclosion as editor will hardly be marked by aposematically coloured covers, though I hope that as I expand my wings this publication will increasingly be seen as good enough reason for country membership.

Taking over from Ted Wiltshire has been trebly inauspicious: our printer also announced his retirement as soon as he saw me. An inevitable consequence is that this issue will be published later than normal. It has not yet been possible to implement improvements, such as a larger typeface, because of a sudden trebling of the rent of our rooms.

Members' views on the form and contents of the Proceedings will meanwhile be welcomed. Some things have been a source of frustration to successive editors, for example the banal reporting of lectures. Whatever was so interesting about all the lectures that are said to have kept the members from their cups for a prolonged question time? Coincidentally a note appears in this issue from the indoor meetings secretary which indicates that he is looking for just the sort of lectures that I have been thinking of soliciting directly as papers. I hope that with texts of these and abstracts of other offerings we shall be able to bring to your notice entomological topics that develop and pass us by in journals that we never see, even in libraries such as that of the Royal Entomological Society.

Another puzzle has always been the disloyalty of members to the journal of their own society: exhibit notes are republished elsewhere and there have been many prolifically publishing members who have rarely offered a paper for the Transactions. At one stage we became convinced that the publication delay of our old annual publication was a prime reason and went to quarterly publication. This did not change the attitude of the old guard. We are slowly gaining acceptance as more than a house journal, perhaps aided by publication delays in other journals and increasing pressure on their available space. It can be stated that our circulation is comparable to that of other British entomological periodicals and that the contents are noted by the abstracting journals.

My policy will be to encourage concise and informative contributions, but not to use a clumsy editorial broadsword to hack out all signs of literacy and lightness of touch. Many journals today publish such arid stuff that it is exceedingly difficult to read and is consigned to the dust as soon as its immediate topicality fades.

In this issue we are fortunate in having personal appreciations of some of the best-known members who died in 1980. These are much more than a catalogue of those facts that can be researched at any time: they are astute observations by personal friends of what drove them, what influence they had as companions, and how they came to amass material that they bequeathed to the Society. It has been my good fortune to have known and collected with all these men and the accounts of them revive vivid memories of Scottish lakes, Madeiran mountains and middens, and a chance encounter with Messrs. Bretherton and de Worms on the Simplon Pass.

R.W.J.U.

The Biology of Butterflies: R.E.S. symposium 23-26 Sept. 1981.

This ambitious symposium has something for everyone. Places still available. Registration fee £27 to non-Fellows, B&B in Imperial College £10.50 per night. Details from R.E.S. Registrar, 41 Queen's Gate, London SW7.

HOW MANY *ARTOGEIA* SPECIES IN AMERICA? (Lepidoptera: Pieridae)

by S. R. BOWDEN

Lydeard, Merryfield Way, Storrington, Sussex

INTRODUCTION

The number of *Artogeia* species in America was made a contentious question by Warren (1963). Apart from the introduced *Artogeia rapae* L., only two species had previously been recognized: "*Pieris napi* L." and "*P. virginiensis* Edwards". Working on the single character of male androconial scale shape, Warren purported to distinguish six species, among which only ssp. *marginalis* Scudder of Oregon was true *napi* L., whereas *bryoniae* Ochseneimer was represented by three northern subspecies. However, no one could fully accept his conclusions, if only because he never specified the degree of difference of shape which justified an inference of specific distinction, and he hardly mentioned other characters.

There are probably about nine distinguishable Nearctic subspecies of the *Artogeia napi* complex; the uncertainties relate chiefly to their grouping into species, and the question which (if any) are conspecific with subspecies on other continents. Conspecificity among allopatric subspecies is not easy to establish, since there is no opportunity for cross-pairing in the wild (which on the biological concept of the species provides the ultimate criterion). We can, however, induce hybrid pairings in captivity, and draw conclusions from their facility and their reproductive success (Bowden 1976).

CROSS-PAIRING OF AMERICAN POPULATIONS

I bred the Nearctic subspecies *oleracea* Harris, *marginalis* and *virginiensis* and hybridized them with one another and with nominotypical *napi* and *bryoniae* from Europe (Bowden 1972 and earlier papers quoted therein). I thus obtained data on the viability and fertility over two or more generations, which I used to assess taxonomic status among the pairs. I concluded, provisionally, that *oleracea* was close to *napi* reproductively and might perhaps be included in the same species but that it would not be unreasonable to separate it; *virginiensis* indeed represented a species distinct from both *oleracea* and *napi*; ssp. *marginalis* at least approached specific separation from *oleracea* and from *napi*. Crosses of these American subspecies with Swiss *bryoniae* could hardly be taken beyond the F_1 ; unfortunately no living material of *hulda* Edwards or *pseudobryoniae* Verity was available. One or other of these northern subspecies might prove conspecific with *bryoniae*, though they seem more reminiscent of Scandinavian *adalwinda* Fruhstorfer, which is a *napi* subspecies on a reproductive criterion (Bowden 1957).

I wish here to re-emphasize a point made previously (Bowden 1976), that cross-breeding results can vary, especially in numerical success, to an extent difficult to control. Individual butterflies, even from the same parents, can vary so much reproductively that experimental pairings should be repeated as far as possible, especially if any eggs laid seem completely infertile or inviable.

In 1951-1953 I made crossings of Swiss *bryoniae* with British *napi* and repeatedly obtained good F_2 broods (Bowden 1956). About the same time Lorković in Yugoslavia had much greater difficulty with *napi* \times *bryoniae*, and was greatly surprised at my beginner's luck (Lorković 1962). In recent years I have several times had occasion to make this cross again, but most frequently the majority of eggs laid by the F_1 hybrid females have failed to hatch — which has not surprised Lorković at all. Quantitative conclusions, then, are subject to error, which must be allowed for.

THE STATUS OF SSP. *MICROSTRIATA* COMSTOCK

It now seems unlikely that I shall ever be able to answer the question in my title. I wish, however, to report some incomplete results for another American population, and ask what conclusions can be drawn. The subspecies in question is *microstriata* Comstock from inner California, which with the closely related parapatric *venosa* Scudder has recently been the subject of interesting work by Shapiro (1975, 1977), who has figured the adults.

In July 1977 I received from Shapiro 20 pupae, all bred from one female of Lang Crossing stock, Nevada County, California. The locality is one of riparian mixed coniferous forest at 1475 m altitude on the western slope of the Sierra Nevada. The eggs had been laid on 22.iv.77, the larvae ate *Brassica*, *Arabis* and watercress freely, and pupation occurred during 18-24.v.77. The pupae were stored near 1°C from November to mid-April 1978, by which time eight were thought to be dead or dying.

The pupae were measured to compare their proportions with other Nearctic and Palaearctic members of the *napi* group. Seven measurements were made on each pupa, as will be reported more fully on another occasion. Here I will say only that whereas *virginiensis* is much more deeply "waisted" than *napi* and *bryoniae*, *microstriata* like *oleracea* shows an intermediate form. Subspecies *marginalis* (but six specimens only) seems rather less waisted even than *napi*. Thus this (probably multifactorial) character puts *microstriata* rather with *oleracea* than with the other subspecies measured.

Thirteen adults (two crippled) eclosed in the first half of May 1978, and most were caged for breeding. The butterflies obtained had white (male) or pale ochreous (female) hindwing undersides, with "*acuta*" marking as in *oleracea*. In one cage among three females and two males at least one pairing occurred (after 3 days!), but about 15 eggs all failed to hatch. In another, one female paired quickly with a Herts. wild *napi* male, but died in less than 2 days without laying. However, a single female paired with a brother after 4 days, when temperature in the sunny greenhouse had risen to 27°C. The temperature a few days later rose to 37°C in consequence of control failure, and the male became moribund, but 26 eggs, all on *Alliaria*, were obtained then. Over the period 10-20.v.78 over 100 eggs were laid. Hatching was good, but the young larvae had to be moved to watercress (American "*napi*" cannot be raised on *Alliaria*); losses began immediately and continued throughout the larval stage in spite of food-plant changes to cultivated mustard, *Sisymbrium officinale* and *Hesperis matronalis* (this last not accepted). The reason for the deaths is not known, since many larvae grew well initially, and four batches were kept separate. The final product was one male eclosed 1.vii.78, crippled by adherent wings, and 3 pupae in diapause, of which two blacked off during or after winter cold-storage.

One good female emerged on 20.v.78, and from this one individual all hybrid broods were derived. About 1-2 hr after caging with a British yellow *napi* male (Head's f. *sulphurea*) she paired with him. Many eggs, on *Alliaria* and watercress, resulted; hatching was good and the larvae fed well on *Alliaria*, losses being very few indeed. Pupae were green or greenish, and all 40 adults eclosed from 28.vi to 9.vii.79 (brood 1979-c).

These F₁ hybrids were large compared with their parents (males up to 28.5 mm, wing-tip to centre of thorax). Upperside black markings in general followed European *napi*, but males, particularly the larger ones, developed a second discal spot below the first. Such a spot, though it must have some genetic basis seems to be associated with the larger subspecies of the group (*neobryoniae* Sheljuzhko. *melete* Ménétriès) and with the larger individuals in any subspecies, in vernal *microstriata* it is rare, but it appears more frequently in spring *venosa*; in the summer males of both subspecies a trace of it is not uncommon (Shapiro, *in litt.*).

For this hybridization the homozygous yellow male had been chosen, as for the corresponding crosses of *ssp. marginalis* (Bowden 1970), in order to detect pale-yellow, even if present in *microstriata* only as the heterozygote. A "pale-yellow" gene had been homozygous in our visibly yellow *marginalis* stock, but our *microstriata* were white. If the *microstriata* female carried pale-yellow, about half her hybrid daughters should be visibly tinged yellow, the allele being dominant to Head's yellow in both British and American stocks (Bowden 1961, 1970). In fact there were 17 males, in which the pale-yellow phenotype could not be distinguished, and 23 females, of which 10 or 11 were pale yellow, at least 3 very definitely so. The mother of the brood seems, therefore, to have been heterozygous for pale-yellow.

Five of the hybrid females were caged with their brothers, and at least 3 of them paired, but no eggs were laid in any cage. Lorković confirmed by dissection that females of this brood were sterile. This female sterility (second type of Lorković 1978) implies that *microstriata* is specifically distinct from European *napi* (cf. similar results of *virginiensis* × *napi*, Bowden 1966).

As expected, the hybrid males were fertile; one paired with a bright yellow *napi* female to produce about 65 eggs (1979-e). There were heavy losses among the unevenly growing larvae, but 8 male + 8 female butterflies eclosed in 1979, leaving 12 pupae to overwinter and yield 8 males only in 1980 (2 died and 2 remained undeveloped). If the male parent was heterozygous bright yellow/pale-yellow, as it had an even chance of being, the offspring should have been half bright yellow and half pale yellow (with males probably indistinguishable from white). These phenotypes did appear. Three pale yellow females were very close to white, but could be recognized in a good light. The significant deficiency of females (8) below males (16), bright yellow males (5) below white (11) and especially of bright yellow females (1) below pale (7) may be explained in terms of the heavy (65%) larval and other losses.

Again in 1979, this first backcross brood *e* was inbred. About 30 eggs (1979-k) were obtained, but hatching was poor and there were further losses in the larval stage, so that only 3 good pupae resulted. The phenotypes expected in (female) offspring were 1 bright + 3 pale yellow. In fact there were 2 bright yellow females (1979) and the one over-wintering pupa remained undeveloped in 1980. The departure from expectation is not significant.

The same backcross male was also backcrossed further to another bright yellow *napi* female. This time the pairing was unduly prolonged (over 3½ hours) and only 4 larvae were obtained from the 38 eggs (1979-l). Resulting adult phenotypes were one white male in 1979 + 2 white males in April 1980. The fourth pupa failed to develop and was discarded dead in September.

In the hybrids, all the pale yellows must have been heterozygous for bright yellow. It would be possible to think of them as carrying no special pale-yellow allele but merely a modified wild-type allele not fully dominant to the bright yellow. But this explanation cannot suffice if pure *microstriata* females are sometimes pale yellow. In fact Shapiro states (*in litt.* 1979) that this is so, and that even a good light yellow male *microstriata* has been taken wild, so a pale-yellow allele, not necessarily identical with those previously described (Bowden 1961, 1970) most simply explains the phenomena. The resulting pale-yellow phenotype comprises a range of very dilute lemon-yellow upperside colours in the female and is normally almost or quite indistinguishable from white in the male. As in all *sulphurea* forms, the yellow tint extends to the disc of the forewing underside.

The inheritance of the *subtalba* or quasi-*subtalba* character needs further investigation. The phenotype shows a remarkably close resemblance to that in the Japanese *ssp. japonica* Shirôzu. As in that still doubtfully assigned subspecies (Bowden 1978, Lorković *in prep.*), but not in the better known *neobryoniae* and *virginiensis*, this *subtalba* shows no dominance in the hybrids. The F_1 undersides

in *napi* × *japonica* had curiously uneven pale lemon-yellow pigmentation; so have those in *microstriata* × *napi*, the yellow being concentrated near the hindwing margin or at the forewing apex.

There are, of course, obvious differences, upperside black markings of the summer emergence being much heavier and more *melete*-like in *japonica*, especially at the forewing apex. The resemblance to *A. dulcinea* Butler of eastern Asia may be even closer, but experimental breeding work with that species remains for the future.

It seems likely that the *acuta* and non-dominant *subtalba* forms as found in American "*napi*", other than *A. virginensis*, have a recent common origin with those in eastern Asia, while *virginensis*, lacking the *acuta* veining and with a dominant *subtalba* fixed, came by a different route from the west-Asiatic "*urnapi*" – possibly via the Greenland area in some warmer episode of the Tertiary era.

The question remaining is the old one: where shall we draw the specific line among allopatric populations? Shapiro (*in litt.* 1979) states that *microstriata* "seems to intergrade into *marginalis* through a series of populations . . . in N.W. California" and asks, "if *marginalis* and *napi* are conspecific, and *microstriata* and *napi* are not, what are we to do about the apparent intergradation?" In my present view, both *marginalis* and *oleracea* have rather less claim than *bryoniae* to be conspecific with *napi*. *Oleracea* has been crossed with *marginalis* (see Bowden 1972) but we concluded from the poor results in the F_2 that these subspecies were "at least approaching full specific separation".

CONCLUSION

How many "species" are represented among ssp. *venosa*, *microstriata*, *marginalis* and *oleracea* must be uncertain at present. Local studies show that the first two are conspecific, perhaps the first three; conceivably all four are. *Oleracea* (1829) is the oldest name.

It is doubtful whether there is any present justification for including them in *napi* rather than in (say) *dulcinea*. In a direct comparison, the androconia of *microstriata* are distinct from those of both *dulcinea* and *napi* – but that is another question.

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I am indebted to Dr A. M. Shapiro for useful discussions in correspondence, and particularly for the living *microstriata*. The present account hardly reveals my debt to Dr Z. Lorković.

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RHAGIO ANNULATUS (DIPT: RHAGIONIDAE): DISTINCTIONS FROM *R. TRINGARIUS* AND RECENT RECORDS.

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Rhagio annulatus Deg. is apparently a rare and local insect. Using available literature it is, in my experience, also very difficult to distinguish with confidence from the much commoner *R. tringarius* (L.). I have come across *R. annulatus* twice: Dorset (England): SY 8587, ♂♂ 29.v/1.vi.1980. Westmeath (Ireland): N 0446, ♀ 10.vi.1976.

The problems I encountered in naming *R. annulatus* were such as to suggest that others may well have similar difficulties if they come across this Rhagionid, leading to specimens possibly being mis-named as *R. tringarius*. Since I have detected morphological differences between these two *Rhagio* species which appear to provide a much more satisfactory means of distinguishing them than those features currently in use, I have listed these "new" features below, seeking also to point out the pitfalls inherent in the keys provided by Verrall (1909) and Oldroyd (1969).

MORPHOLOGICAL DIFFERENCES BETWEEN *R. ANNULATUS* AND *R. TRINGARIUS*

Oldroyd (l.c.) and Verrall (l.c.) use almost identical key characters in segregating *R. annulatus* from *R. tringarius*, namely that the abdominal and thoracic pubescence of the former is "pale", while in the latter it is black. Oldroyd adds that the fore coxae of *R. annulatus* are "grey", while those of *R. tringarius* are "yellow". In the specimens of *R. annulatus* I have examined (see below) the thoracic and abdominal pubescence is a mixture of whitish and black hairs over much of the surface, with black, bristly hairs predominating on the mesonotum of one female and on the basal abdominal tergites of the males. The thoracic and abdominal hairs of *R. tringarius* are, conversely, all, or nearly all, black, with the exception of the pleural hairs in both sexes and hairs on the male basal abdominal sternites, which are pale greyish-yellow. Oldroyd's mention of yellow fore coxae in *R. tringarius* is rather misleading, because in this species the fore coxae can be dark grey, like those of *R. annulatus*. In both species, the fore coxae are covered in long, whitish or yellowish hairs.

Additional morphological distinctions, useful in separating *R. annulatus* from *R. tringarius* in both sexes, are listed in the following table. Seeing the intra-specific variability *Rhagio* species exhibit in their colour characters, it is possible that the colour of the humeri and body hairs is more variable than indicated in the table. The presence or absence of hairs on sternite 1 and the relative length of fore-tibial bristles may thus prove the most useful of the features listed.

Feature	<i>R. annulatus</i>	<i>R. tringarius</i>
Thoracic humeri	grey	yellow
Notopleural ridge	hairy	bare
Mesonotal hairs	mixed pale yellow and black	all, or nearly all black
Dorsal bristles on front tibiae	as long as tibia is wide	less than half as long as tibia is wide
Abdominal tergites, hair covering	mixed pale yellow and black	all, or nearly all black
Abdominal sternites, hair covering	all whitish on apical 3-4 sternites	all, or nearly all black on apical 3-4 sternites
Sternite 1	hairy	bare

Specimens examined

Number	6	11
Origin	Great Britain, Ireland	Great Britain, Ireland, Spain

BIOLOGY OF *R. ANNULATUS*

Almost nothing seems to be known about this Rhagionid. Oldroyd (l.c.) suggests that its apparent rarity may be an artifact, engendered by its close similarity to *R. tringarius*. I would add that available records indicate *R. annulatus* to be a Spring species, with a short flight season from the second week of May into the first half of June. In Western continental Europe, where *R. annulatus* is known from N. France through Germany to Scandinavia its flight season is again primarily May/June, but at the north end of this range there are later records: most Danish records are for June and there is a Finnish record for July (see Krizelj, 1971).

Continental records suggest *R. annulatus* is a fly of well-established deciduous woodland, and the two localities in which I have found this Rhagionid are both poorly drained, old deciduous woods with a dense shrub layer, the *R. annulatus* occurring in both cases within a few feet of water. The only other recent record of *R. annulatus* from England (Alan Stubbs, pers. comm.) is from deciduous woodland in the bottom of a chalk valley – a rather different situation.

My four Dorset specimens of *R. annulatus* were collected only a few yards from each other, in acres of woodland which, despite careful searching under reasonable conditions, yielded no *R. annulatus* in other parts. These Dorset specimens were all on foliage of large-leaved, low-growing bushes, in the shade or in dappled sunlight. The Irish *R. annulatus* locality was fully described at the time that the record was first published (see Speight, 1977). The specimen involved was collected while possibly ovipositing, among stones on a narrow lake beach, fringed by oak woods.

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BUTTERFLIES IN CORFU (KERKYRA) IN LATE AUGUST, 1980, WITH A PROVISIONAL LIST OF ALL SPECIES KNOWN FROM IT.

by D. W. BALDOCK* and R. F. BRETHERTON†

PART I

The sickle-shaped island of Corfu lies near the south of the Adriatic Sea at its junction with the Mediterranean. It is some 40 miles (64 km) long from northwest to southeast, and 18 miles (28 km) wide in the north, but tapering abruptly to less than half that width for most of its length. Its backbone is a limestone ridge which just touches 3,000 ft (914 m) on Mt. Pantokrator in the north but declines rapidly southwards. The ridge is flanked by luxuriant valleys on richer soils, and the southern tip of the island contains stretches of sand dunes and a lagoon beside the sea. Unlike most Greek islands, Corfu is well watered, having plentiful rains and a little snow on the mountains after a long summer drought. The northern quarter of the east coast faces south Albania across a strait which narrows to only 1¾ miles (3 km); the remainder looks to western Greece across a wide but almost land-locked bay. The lepidoptera are therefore mainly Balkan in character, although migratory species may also come from Italy or across the Mediterranean from north Africa.

D. W. Baldock during a family holiday from 18th to 31st August 1980, which was not mainly devoted to collecting and was confined to the most northern part of the island, observed the species listed below. Specimens of most of these were brought home, and their identifications have been checked by R. F. Bretherton; a few species, marked with an asterisk, were identified only in the field. The nomenclature and order follow Higgins & Riley (4th revised edition, 1980).

**Papilio machaon* (L.). Common and widespread.

**Iphiclidea podalirius* (L.). Frequent and widespread.

**Pieris brassicae* (L.). Frequent and widespread.

Artogeia rapae (L.). Widespread. Kaminaki; Roda; Paleokastritza.

Artogeia napi (L.) *meridionalis* Heyne. Kaminaki, 22.viii, a small male, very lightly marked upperside, on underside dark vein scales barely vestigial, probably of gen. III. First record for Corfu.

Artogeia krueperi (Staudinger). Kaminaki, 22.viii, and widespread among rocks near the north east coast. Small, lightly marked; presumably of gen. III. First published record for Corfu, though known to occur, without detail. The species is locally common on the Greek mainland; the absence of previous records and its present location suggest that it may have colonised Corfu only recently.

Colias crocea (Fourc.). The type common and widespread, but only one f. *helice* Hubn. seen.

**Gonepteryx cleopatra* (L.). Few but widespread.

Leptidea sinapis (L.). Very common and widespread. Specimens small; upper-side apical spot solid and black in male, but absent in female; underside immaculate in both sexes, with slight yellowish tinge.

Lycena phloea (L.) f. *elea* F. Common: Kaminaki; Roda; West coast. Very dusky, tails moderately developed. Probably of gen. III.

Lampides boeticus (L.). Kaminaki, one, very worn.

Syntarucus pirithous (L.). Kaminaki, common, and widespread elsewhere. Size very variable, 19/29 mm.

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- Tarucus balkanicus* (Freyer). Kaminaki, 22.viii, one female in fair condition. First record for Corfu. The species is very local but common where found in central Greece and in Albania, among its food-plant, *Paliurus spina-christi*.
- Celastrina argiolus* (L.). Kaminaki, a few. Female of f. *aquilina* Grund, with forewing black borders very broad and hindwing almost completely black. Possibly of gen. III.
- Polymnatus icarus* (Rott.). Kaminaki; Roda; Mt. Pantokrator. Size very variable: several of 34 mm wingspan, but also dwarfs down to 21 mm.
- Limenitis reducta* (Stdgr.) *schiffermuelleri* Higgins. Common and widespread; Paleocastritza; Mt. Pantokrator. Great size variation: male 51 mm, female 62 mm.
- **Vanessa atalanta* (L.). Only one seen.
- **Cynthia cardui* (L.). Very common and widespread.
- Polygonia c-album* (L.). Mt. Pantokrator, one. Very small, with strong dark borders upperside, underside black, with white discal mark greatly reduced: f. *j-album* Gillmer, of gen. II.
- **Polygonia egea* (Cramer). Widespread and common.
- **Pandoriana pandora* (D. & S.). Kaminaki, one only, seen closely.
- **Argynnis paphia* (L.). North of Paleocastritza, west coast, one only seen.
- Melitaea didyma* (Esp.) *meridionalis* Stdgr. Widespread; Paleocastritza; Kaminaki; Roda. A large female of gen. I form; small males of f. *dalmatina* Stdgr., apparently gen. II.
- Neohipparchia statilinus* (Hufn.) f. *fatuaeformis* Vrtý, as in eastern Greece. Very common on stony slopes of hills; Paleocastritza; Mt. Pantokrator. First record for Corfu.
- Maniola jurtina* (L.) *hispulla* Esp. Common and widespread. Very large, mostly worn.
- Coenonympha pamphilus* (L.) *lyllus* Esp. Common and widespread. Males small (30-32 mm), females very large (38 mm).
- Pararge aegeria* (L.) *tircis* Butler. Kaminaki; Paleocastritza. Not differing much from British summer examples.
- Lasiommata megera* (L.) Widespread. Kaminaki; Paleocastritza.
- Lasiommata maera* (L.) *adrasta* Illiger. Paleocastritza; Mt. Pantokrator. Small, gen. II.
- Kirinia roxelana* (Cramer). Kaminaki, 22.8; Mt. Pantokrator. Common and mostly in good condition among bushes on rocky slopes. The very late date probably indicates gen. II.
- Syrictus proto* (Ochs.). The commonest Skipper seen. Kaminaki; Mt. Pantokrator; Roda. The species occurs, possibly as a migrant, round the Mediterranean from Spain to Lebanon, in forms which have not been fully studied. These specimens have upperside white markings strong, underside ground colour light brown. Only previously reported on the island of Vido in September 1897.
- Carcharodus alceae* (Esp.). Kaminaki, one only, others seen.
- Carcharodus orientalis* (Rev.). Paleocastritza, 23.8, one male. Probably the first published record for Corfu, though it may have been confused with another species in the past.
- Gegenes pumilio* (Hoffmansegg). Kaminaki, 22.8, one male, in fair condition: the only example noticed. Probably the first confirmed record for Corfu; it may, however, have been reported under the name *G. nostrodamus* (F.), from which it was not then clearly distinguished, on the island of Vido in September 1897.

The observations were made in a short period, late in the season, in a limited area, and without special search. Nevertheless, they cover 34 species, including six

of which no previous confirmed records for Corfu have been traced. In all this is more than half of all the butterflies previously certainly known to occur there. It gives some idea of the richness of the butterfly fauna of the island, and suggests that further discoveries remain to be made.

ANASIMYIA CONTRACTA TORP & CLAUSSEN, 1980 AND *A. INTERPUNCTA* (HARRIS 1776) (DIPTERA: SYRPHIDAE) IN BRITAIN.

by ALAN E. STUBBS

Several hoverfly workers have come to recognise that two species of *Anasimyia* consist of species pairs. The paper by Torp and Claussen (1980) describes the new taxa and enables the British list to be revised. *A. lineata* (F.) remains unaffected.

The county records given below are based upon specimens which I have examined, based largely upon my own collection and that in the British Museum (Natural History). Other dipterists have material of these species but a fuller review of distribution will be a longer term objective to be carried out by the Hoverfly Recording Scheme. Speight (1981) reviews the Irish list and keys the British species.

ANASIMYIA CONTRACTA

This species resembles *A. transfuga* (L.). However, in *contracta* the lateral margins of the abdomen are contracted (angled inwards) on tergite 2 whereas the margins are straight in *transfuga*.

Both species are very widespread in southern Britain though local and easily overlooked. *A. contracta* is the more frequent species and is normally found on or about *Typha latifolia* L. (reed mace) growing in ditches and at the edges of ponds and lakes. Available county records are Berks., W. Corn., S. Devon, N. Essex, N. Glos., S. Hants., W. Kent, I.o.W., Middx., E. Norf., N. Som., Surrey, W. Sussex, Warwk. On rare occasions both species occur together but so far the ecological requirements of *A. transfuga* are less clear apart from lacking an obvious association with *Typha* habitats. *A. transfuga* is known from Anglesey, S. Devon, Glam., Heref., Hunts., E. & W. Kent, Middx., Notts., N. Som., Surrey, Sussex, S. Wilts. Torp and Claussen did not include Great Britain within the European distribution range for *contracta*.

ANASIMYIA INTERPUNCTA

This species was formerly confused with *lunulata* (Mg.) though in the 1976 check list the name was placed as a junior synonym of *transfuga*. It is far from clear which species Harris might have illustrated from Britain. However, a neotype was designated on the basis of a male in the British Museum (ex Clifton Collection, Britain). Thus *interpuncta*, as redefined, has now been published as occurring in Britain as part of the known European range but attention needs to be drawn to *interpuncta* in the British literature.

The separation of the two species is not so easy. The face is more extended in profile in *lunulata*, especially in the female. In the male abdomen, *interpuncta* has the black area more extensive on tergite 5 and the pale markings on tergite 4 are angled at the edge of the segment rather than straight. In the female of *interpuncta* the pale markings on tergites 4 and 5 are elbowed (but not so strongly oblique as

in *contracta* and *transfuga*) whereas in *lunulata* the posterior margins of these markings run straight to the edge of the segments.

Though *interpuncta* is the commoner of the species pair in Denmark, it is seemingly a rarity in Britain. The ecology is clearly distinctive since all records are from non-acid areas in fens and mineral marsh. I have seen material from the following counties (but am aware that some collectors believe they have additional material from a few localities): Cambs. (Wicken Fen, 1 ♂ 1 ♀ 13.v.1979 (and other dates), I. Perry), Hunts. (Woodwalton, 1 ♀ 10.v.1923, N. C. Rothschild, British Museum), Middx. (Boston Manor 1 ♀ 14.v.1930, 1 ♀ 19.v.1933, A. Low, British Museum). Since this is an early species for wetland habitat, it could have easily been overlooked in other localities.

By contrast *lunulata* is a species of acid bogs and is probably widespread at low altitude though very local in such habitat but specimens have only been seen from Anglesey, Caerns., E. Corn., Dorset, Glam., S. Hants. S. Som., Surrey, Suth.

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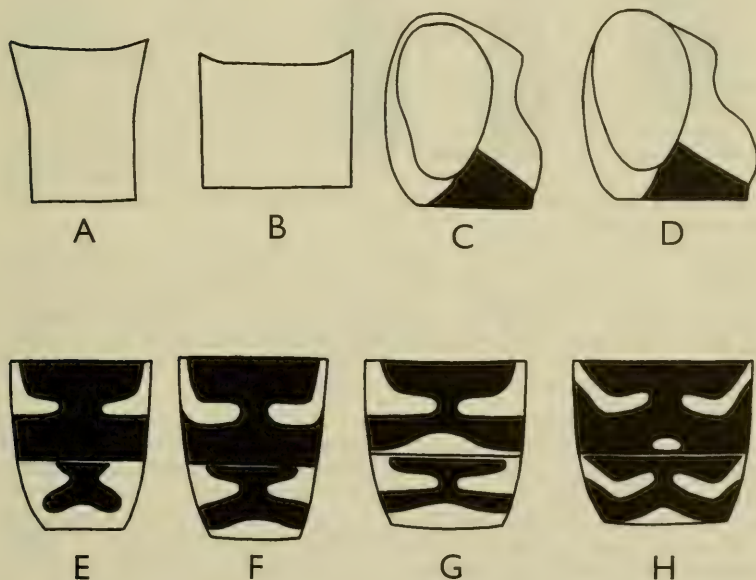


Fig. 1. A & B, second tergite of male, A - *contracta*, B - *transfuga*. C & D, head profile, C - *interpuncta*, D - *lunulata*. E & F, fourth and fifth tergites of male, E - *lunulata*, F - *interpuncta*. G & H, fourth and fifth tergites of female, G - *lunulata*, H - *interpuncta*.

**NEOASCIA INTERRUPTA (MEIGEN, 1822)
(DIPTERA: SYRPHIDAE) NEW TO BRITAIN**

by S. J. FALK, D. A. SMITH and A. E. STUBBS

Among our very small hoverflies, the genus *Neosciasia* is distinctive in having a waisted abdomen. Tiny black wasp-like species at low growing flowers or hovering low around vegetation along sunny woodland edges and in open marshes will often prove to be these flies. The rather similar genus *Sphegina* by contrast normally keeps in the shade and the three species are rarely seen by the casual observer.

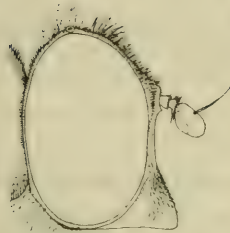
The British list has previously consisted of five species. Superficially, these break down into two groups, those with clouded outer cross-veins (*podagrica* (F.) and *obliqua* (Coe)) and those lacking such clouds (*aenea* (Mg.), *dispar* (Mg.) and *geniculata* (Mg.)). This is the character used in the first key couplet by Coe (1953). However, another feature is used as a primary character by such workers as Bei-Bienko (1970) whereby the posterior part of the thorax above the hind coxae is chitinated (*podagrica* and *dispar*) or membranous in the mid line (*obliqua*, *aenea* and *geniculata*). The latter character is not always easy to define nor completely reliable.

Neosciasia interrupta has the outer cross-veins clouded and thus resembles the common *N. podagrica* and the rarer *N. obliqua*. However the third antennal segment is short in *interrupta* (see illustration) whereas it is about 2 to 2½ times as long as wide in the other two species. Also, *interrupta* is normally distinctive in having orange spots on tergite 4, though these spots are faint in some males and absent in one female (where spots are absent, adpressed hairs usually give a greyish hue at some angles). In the female, tergite 2 has straight, rather than incurved margins. There is a membranous gap above the hind coxae. The accompanying illustrations demonstrate the normal condition in each sex with well developed abdominal markings, as well as examples with reduced markings.

The species has been recognised largely on the basis of material recently collected by the authors. However, on checking through the British Museum collection, a female *interrupta* was found midst a series of 49 *podagrica* in the Parmenter Collection.

WEST KENT: 1 ♀ 3.vi.1951, Higham, L. Parmenter; 3 ♀♀ 10.vi.1980, Cliffe Marshes, A. E. Stubbs; 3 ♂, 30+ ♀♀ 8/10.ix.1980, Cliffe Marshes, A. E. Stubbs & I. F. G. McLean. EAST KENT: 1 ♂ 1.ix.1980, Elmley Marshes, Sheppey, A. E. Stubbs. SUSSEX: 1 ♀ 21.vii.1980, Ditchling Common, S. Falk. SOUTH ESSEX: 12 ♂♂, 9 ♀♀ 19.iv.-25.vii.1979-1980, Dagnam Park, D. A. Smith; 1 ♂ 9.vi.1979, Great Wobering, D. A. Smith; 1 ♀ 29.vii.1977, Stanford-le-Hope, G. Glombeck. HUNTS. 1 ♀ v.1970, Woodwalton Fen, P. J. Chandler.

All recent specimens have been taken at the margins of standing water. In Kent they were beside ditches on grazing marsh, normally where emergent vegetation was present but mostly swept from grasses and other herbage at the foot of the bank of the ditch. The largest concentration was where *Apium nodiflorum* (L.) Lag. flowers occurred and *Typha* was often but not always present. The ditches were mostly slightly brackish judging from the presence of *Scirpus maritimus* L. In Surrey, the specimen was found beside a pond with *Typha* and *Juncus effusus* L. grading back into *Eriophorum angustifolium* Honck., the situation being within a very sheltered glade on a wooded heath. In Sussex the habitat was a pond with rich marginal vegetation including *Typha*. In Dagnam Park the hoverfly was usually taken beside small ponds amongst rich vegetation such as *Iris*, *Typha*, *Epilobium* and *Juncus* (but not *Phragmites*). It is probable that *interrupta* will be found to have a wide distribution in such habitat. How-



S.F.



Neopascia interrupta. Whole insect: ♀ with well developed markings on the abdomen, ♀ abdomen with reduced markings (right). The narrow abdomens show two ♂ variations. The profile of the head illustrates the short 3rd antennal segment. (Drawn by S. Falk).

Neopascia interrupta. Lateral view of male genitalia.

ever, it was very localised when searched for in September 1980 at various localities on the North Kent Marshes. Also it is noteworthy that Parmenter's specimen was taken within a mile or two of Cliffe Marshes and that his *Neoascia* from many localities around London lacked further material. The recent recognition of the species from widespread localities could be explained as recent colonisation from the Continent but its occurrence in Britain 29 years ago suggests that *interrupta* has been an overlooked species.

The most likely further *Neoascia* species which could occur in Britain is *N. floralis* Mg., a clear winged species with a complete strip of chitin above the hind coxae. There has been some confusion over the application of the name *floralis* but Coe 1953 illustrates the aedeagus of his understanding of the species. According to Pedersen (1971) the hind femora are black with the basal fourth yellow and the hind tibiae are black with the apical fifth yellow. There are nearly entire bands on tergites 2 and 3 which are said to be straight but a pair in the British Museum has the band on tergite 2 markedly angled as an inverted V. Pedersen remarks that in Denmark this species is found on Umbelliferae beside a shaded stream. A small hoverfly in such habitat could easily pass undetected in south-eastern England.

Messrs. P. J. Chandler and G. Glombeck have kindly permitted their records to be cited. Thanks are passed to Dr. M. C. D. Speight and Mr. I. Perry for advice and confirming that so far they have not obtained material in Ireland and Cambridgeshire respectively.

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NEUROPTERA FROM BUCKINGHAM PALACE GARDEN, LONDON

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In his introduction to the non-lepidopteran insects collected in the survey of Buckingham Palace Garden, Richards (1964) remarked that, due to the limitations of the survey, the faunal lists were far from complete. This was particularly true of the Neuroptera, where only three species were recorded compared with the twelve reported from central London by Pinniger (1946).

Following the initial survey, sampling of Lepidoptera has continued on a limited scale, by Dr. J. D. Bradley of the Commonwealth Institute of Entomology, using a Robinson-pattern mercury-vapour light-trap. This paper gives details of the Neuroptera taken recently in or around this trap. The material is deposited in the British Museum (Natural History).

I am grateful to Dr. Bradley for allowing me to examine the material and to Mr. F. C. Nutbeam, now retired Head Gardener, whose assistance in maintaining

* Now at Towneley Hall Art Gallery & Museums, Towneley Hall, Burnley, Lancs., BB11 3RG.

the light-trap operation was much appreciated. Additional distribution data were contributed by Dr. R. R. Askew, Dr. G. Bryan, Miss M. Dearden, Mr. J. Muggleton, Dr. M. R. Shaw, Mr. C. R. Vardy and Prof. G. C. Varley. I also wish to thank Miss H. Brown for producing the plate photographs from original colour transparencies.

CONIOPTERYGIDAE

Semidalis aleyrodiformis (Stephens) 1 ♀, 5.viii.1974.

Killington (1936) noted that *S. aleyrodiformis* occurred in gardens and recorded it from various deciduous trees and bushes and also from evergreens.

SISYRIDAE

Sisyr fuscata (Fabricius) (Fig. 1) 1 ♂, 13.viii.1973; 3 ♀♀, 4.viii.1975; 1 ♂, 1 ♀, 8.viii.1975; 1 ♂, 3.x.1975; 1 ♂, 27.vi.1979.

S. fuscata was common at the Metropolitan Water Board's Tottenham Reservoirs, in the early 1920s (Withycombe, 1924), and was recorded at Staines, Middlesex, in 1975. The larva is aquatic and is predatory upon freshwater sponges which have yet to be recorded from the Palace Garden lake.

HEMEROBIIDAE

Micromus variegatus (Fabricius) 1 ♀, 12.vii.1974; 1 ♀, 13.viii.1979.

This species appears to be quite widespread, and occurs in town and suburban localities; it has been taken in South Kensington, London. Its usual habitat is thick herbaceous undergrowth and long grass.

Sympherobius pygmaeus (Rambur) 1 ♂, 9.vi.1976; 1 ♂, 14.vi.1976; 2 ♂♂, 1 ♀, 15.vi.1976.

Ward (1965) collected *S. pygmaeus* at an MV trap in a Hertfordshire garden. The species is widely associated with oak.

Hemerobius lutescens Fabricius 1 ♀ and a specimen with abdomen missing, 4.viii.1975; 1 ♂, 15.vi.1976.

H. lutescens is widespread and is often common in wooded situations.

Hemerobius nitidulus Fabricius 1 ♂, 13.viii.1979.

This is an unexpected species in the Garden, it is often found in abundance on pine. Conifers are a relatively recent addition to the Garden flora and the species is probably a contemporary introduction.

Wesmaelius subnebulosus (Stephens) 1 ♀, 19.vii.1972; 1 ♀, v.1973; 1 ♀, 12.vii.1974; 2 ♂♂, 4.viii.1975; 1 ♂, 6.viii.1975; 2 ♀♀, 8.viii.1975; 1 ♀, 28.vi.1976; 1 ♂, 29.ix.1977; 1 ♂, 13.viii.1979.

W. subnebulosus is a common town-inhabiting species, I have taken the adult from *Tilia* and *Acer* on recently landscaped areas on the university campus in Manchester. Groves (1959) reported the species from the Cripplegate bomb-sites in the City of London.

CHRYSOPIIDAE

Chrysopa carnea Stephens 1 ♂, 21.v.1976; 1 ♀, 1 sex indet., 14.vi.1976; 2 ♂♂, 28.vi.1976; 1 ♂, 1.vii.1976; 2 sex indet., 7.x.1977; 1 ♀, 28.ix.1979; 1 ♂, 5.x.1979.

C. carnea is probably the most commonly encountered of all the British Neuroptera. The adult often overwinters indoors and is frequently attracted to house lights. The species has been collected by MV light-trap on the roof of city centre development, near Piccadilly in Manchester (Lancashire). The larvae

exploit a variety of habitats, predating aphids on a number of tree species and thrips on flower heads, particularly of umbelliferous species.

Chrysopa albolineata Killington 2 ♂♂, 4.viii.1975.

This is also a common species in towns, and was reported from the Cripplegate bomb-sites by Groves (1959).

Chrysopa septempunctata Wesmael 1 ♀, 22.vii.1975; 1 ♀, 1.vii.1976, 1 ♀, 12.ix.1979.

Killington (1937) reported *C. septempunctata* as common in gardens and orchards, even in large towns. The larva has been taken from herbaceous undergrowth and also from deciduous trees. Groves (1959) recorded the species from the Cripplegate bomb-sites and Ward (1965) collected fifty-one specimens between the months of June and September, by MV light-trapping in a Hertfordshire garden. The species occurs on derelict land in central Manchester.

Chrysopa phyllochroma Wesmael 1 ♀, 9.vi.1976.

Kis and Ujhelyi (1965) described a new species, *Chrysopa commata*, distinguished from *C. phyllochroma* by the possession of a dark spot on the antennal scape and the less-pronounced development of gonocristae on the male genitalia (see Barnard 1978), and distinguished from *C. abbreviata* by the possession of simple tarsal claws. In the usually smaller *C. abbreviata*, the claws are dilated at their base.

Whilst the description by Killington (1937) clearly refers to a species with immaculate scape, Kis and Ujhelyi (1965) considered that Killington's figure of the male genitalia illustrated the new species *C. commata*.

Hölzel (1967) discussed the *phyllochroma*-group from Mongolia and considered that the lateral development of abdominal sternites 8 and 9, in the male genitalia, provided the most reliable character for separating the species.

Dorokhova (1973) described the *phyllochroma*-group from the Leningrad region and re-appraised the characters for the separation of *C. phyllochroma* and *C. commata*.

The descriptions by Kis and Ujhelyi and Dorokhova are compared in Table 1. In the 98 British specimens of the *phyllochroma*-group that I have so far examined, including those available to Barnard (1978), I find the scape to be immaculate in all but four specimens which display a vague faint marking on the inner aspect which does not resemble the distinct, dark spot attributed to *C. commata*. In the immaculate specimens, the gonocristae of the male genitalia appear more variable than has hitherto been suggested, and whilst extreme examples tend towards the condition characterizing *C. commata*, intermediate forms possessing both large and small teeth also occur. The characters derived from the thoracic markings, the basis for the separation of female specimens according to Barnard (1978), do not appear to be consistent in the British material, nor do they agree with extremes of gonocristal development in the males.

In the Buckingham Palace Garden specimen, the antennal scapes are immaculate and the post-ocular lobe is marked with a dark spot. On the thorax, the anterio-lateral margin of the pronotum is black and a black spot is present at the base of each foreleg. The meso- and metanotum are marked with a dark triangular spot at the base of each wing. The lateral thoracic sutures are dark.

C. phyllochroma is widespread but rarely numerous and the examination of a large number of specimens is therefore difficult. However, after examining a larger series than has hitherto been available, I attribute all the available British material to *C. phyllochroma*; the addition of *C. commata* to the British list appears unwarranted on the present evidence.

Zeleny (1969) noted that the bionomic differences between the two species in Czechoslovakia were slight. Both have been recorded from agricultural field crops

and Killington (1937) reported records from open waste fields. Galecka and Zeleny (1969) found it impossible to differentiate, with certainty, between the larvae of *C. phyllochroma* and *C. commata* from Poland.

TABLE 1

Comparison of *Chrysopa phyllochroma* Wesmael and *C. commata* Kis & Ujhelyi.

<i>C. phyllochroma</i>	<i>C. commata</i>
Kis & Ujhelyi (1965)	
Post-occipital spots usually present	Post-occipital spots usually absent.
Scape immaculate.	Scape with dark spot on inner side.
Cervical stripe on ventral side of pronotum short; spot at base of forelegs absent.	Pronotum with dark stripes in cervical area and at base of forelegs.
Spots at wing bases on meso- & meta-thorax small and indistinct.	Spots at wing bases on meso- & meta-thorax large and brown.
Sutures on sides of thorax and anterior abdomen body-coloured.	Sutures on sides of thorax and anterior abdomen black
♂ gonocristae well developed, long pointed teeth in 2 rows; lateral lobe of gonarcus large, longer than high.	♂ gonocristae well developed, crescent-shaped with minute teeth in rows of 4-5, lateral lobes of gonarcus wide, as long as high.
Dorokhova (1973)	
Head markings well defined, persistent.	Occiput sometimes marked with a spot.
	Scape often with a spot on the inner side.
Spot at base of foreleg absent.	Spot at base of foreleg present.
Pleural sutures of thorax and first abdominal segments body-coloured.	Pleural sutures of thorax and first abdominal segments black, more rarely brown.
♂ gonocristae forming a row of large dark teeth.	♂ gonocristae with small teeth in rows of 3-4; lateral lobes of gonarcus almost as broad as long.

Chrysopa perla (Linnaeus) (Fig. 3) 1, abdomen missing, 12.vi.1970.

Whilst *C. perla* is widespread throughout England, it is a species of rank herbage, scrub, copse and woodland with rich undergrowth. It is not commonly encountered in urban gardens.

Nothochrysa capitata (Fabricius) (Fig. 2) 1 ♀, 25.vi.1974.

N. capitata has been associated with conifers and Killington (1937) reported the adult from yew, Scots pine and Weymouth pine. New (1970) recorded six larvae from yew at Wokingham, Berkshire, and two larvae from hawthorn at Silwood Park, Berkshire.

At Abbots Moss, Cheshire, the adult has been collected on *Pinus sylvestris* and, at the same locality, the larva has been collected on *Quercus*, *Betula* and *Fagus* and from *Sorbus aucuparia*. Although the species is widely distributed it is usually uncommon and its occurrence in the Palace Garden is noteworthy.

Of the twelve species reported from London by Pinniger (1946), five have yet to be recorded from Buckingham Palace Garden. These include *Conwentzia psociformis* (Curtis), a widespread coniopterygid which was abundant on oaks and plane trees in the heart of London (Withycombe, 1923). All the stages of this species have been recorded from *Quercus* and *Acer pseudoplatanus* in large mature gardens and in wooded urban parkland in Manchester (Lancashire) and from *Ilex aquifolium* and *Camelia sinensis* in the gardens of Singleton Park, Swansea (Glamorgan) and on *Viburnum tinus* at Keble College, Oxford. In the Hemerobiidae, *Hemerobius humulinus* L. is similarly unrecorded; the species is typical of wooded situations and tall herbage. In the Chrysopidae, Pinniger reported three species which remain to be recorded in the Garden. *Chrysopa flava* (Scopoli) has a wide range, often occurring in central areas of towns and cities, particularly on *Acer* species. *Chrysopa vittata* Wesm. and *C. ventralis* Curtis, also noted by Pinniger, are unlikely to be common inhabitants of the central areas of towns and cities.

No representative of the Megaloptera has been taken in the Palace Garden although the lake might be expected to support *Sialis*.

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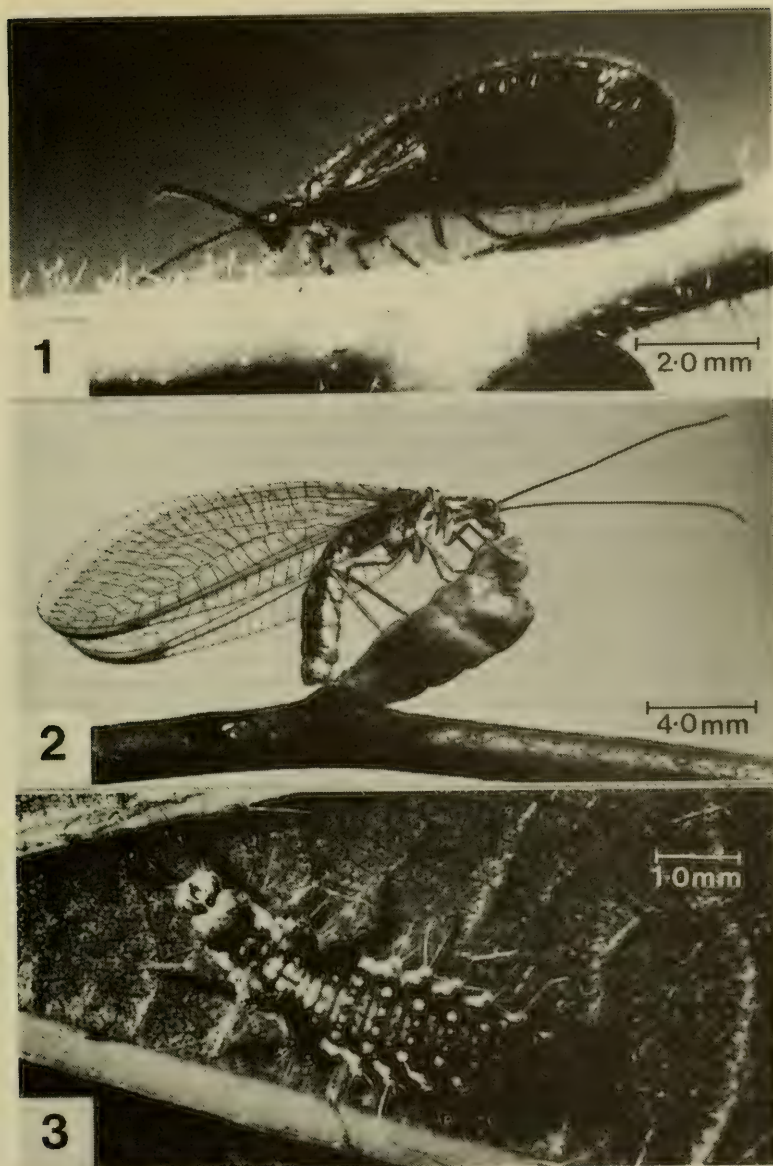


Fig. 1 *Sisyra fuscata* (Fabricius)

Fig. 2 *Nothochrysa capitata* (Fabricius)

Fig. 3 *Chrysopa perla* (L.) — third instar larva

INSECT MIGRATION: FURTHER RECENT FINDINGS†

by R. C. RAINEY*

(formerly of Centre for Overseas Pest Research)

Following up an earlier communication (Rainey 1980), some further findings on insect migration are presented from recent work on major migrant pests.

The first is the new evidence of the degree of regularity with which small blackflies (*Simulium damnosum* Theob., the blood-sucking vector of river blindness, and particularly its savanna sub-species), with a span of only 4.5 mm, can make flights over distances of hundreds of kilometres; in the words of René Le Berre (1979), first Chief of the WHO/OCF Vector Control Unit, 'the blackflies have now entered the club of the migrant pests.' This evidence has come from the very success of the WHO Onchocerciasis Control Programme (Walsh, Davies & Le Berre 1979, or, very briefly, White 1980), in the near-completeness with which every breeding site among the rapids of 14,000 meticulously-monitored kilometres of the rivers of seven West African countries has been kept free of larvae, so that trickles of blackflies still intruding into this cleared area could be attributed, beyond all reasonable doubt, to reinvasion from known uncontrolled breeding areas up to 600 km distant.

One of the many techniques of investigation tried during the elucidation of these reinvasions was aircraft-trapping (Walsh *et al.*, in prep.), using equipment designed to slow down and soft-land flying insects with minimal damage (Spillman, in press), and indeed capable (as shown in Canadian trials) of collecting living mayflies at an airspeed of 150 knots. The million cubic metres of air so sampled over reinvasion areas of Ivory Coast and Upper Volta yielded more than 1500 insects (and spiders), with representatives of 36 families, and included five simuliids, though no *S. damnosum* – of which indeed only a single specimen was obtained from something like a hundred million cubic metres of air during C. G. Johnson's suction-trapping trials in these areas the following season. The Pilatus Turbo-Porter research aircraft used in this work was also equipped with a Doppler radar navigation system, giving precision wind-finding, which provided new information on the wind-systems in which the insects were flying – including several of the squall-lines characteristic of this region.

The same aircraft and equipment have also been used to locate and explore a number of other wind-systems known to be of importance in relation to the movement and concentration of flying insects (Rainey 1976). These have included the sea-breeze front of southern England, the African Rift convergence zone, the mountain winds of Kenya and Kilimanjaro, the Red Sea convergence zone, and, particularly, the intertropical convergence zone in the Sudan – where guidance from Professor Schaefer's ground radar made it possible to trap the migrant plague grasshopper *Aiolopus simulatrix* (Walk.) in flight by night at heights up to 1200 m above the ground, and moreover at densities such that even at a height of 450 m these grasshoppers were only some 6 m apart. A further striking radar result from this work, in the Sudan Gezira irrigation scheme, was the recognition of plumes of flying noctuid moths (*Heliothis armigera* Hb. and *Spodoptera littoralis* Boisd.), climbing into the night after taking off exclusively from individual fields of ground-nuts which were in flower and probably the only major source of nectar from the rotation crops in the vicinity (Schaefer 1976).

† Abstract of paper read 12th June 1980.

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This same approach to the investigation of the flight of major pests, by the co-ordinated use of radar, specially-equipped aircraft, and local expertise in synoptic meteorology, together with well-established, wide-ranging and intensive insect survey on the ground (and again owing much to the guidance of Professor R. J. V. Joyce of Cranfield), was subsequently followed in a Canadian four-year field research programme (Greenbank Schaefer & Rainey 1980) on the flight of spruce budworm moths (*Choristoneura fumiferana* Clem., Tortricidae), in New Brunswick, where this species represents one of the province's major economic problems. A particularly important new feature of this programme was the introduction and extensive use of downward-looking airborne insect-detecting radars, developed by Glen Schaefer (1979), capable of detecting individual budworm moths down to the forest canopy from an aircraft height of 750 m, and of recording a profile showing moth density (and alignment) at each of 32 different levels every 10 m along the track of the aircraft. Two such radars, one in a Piper Aztec and one in a DC-3 equipped also for insect-sampling, wind-finding, and for sensing air temperature, humidity and turbulence, provided new and quantitative evidence of the progressive concentration of budworm moths at a sea-breeze front as it advanced inland from the cool Bay of Fundy during the evening; the wind-shift, turbulence and changes in air temperature and humidity as the aircraft traversed the front, and the corresponding peak of moth concentration, were all recorded within a distance of 2 km.

While this new evidence of concentration of flying insects by wind-convergence illustrates how radar has confirmed and extended some earlier inferences from less sophisticated data, other radar observations on insect flight have been totally unexpected — particularly the very striking uniformity of orientation shown by many high-flying insects, often but by no means always down-wind (Schaefer 1976, Riley & Reynolds 1979).

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1980 ANNUAL EXHIBITION

Chelsea Old Town Hall — 1st November 1980

MACROLEPIDOPTERA

AGASSIZ, Rev. D.J.L. — *Eublemma parva* Hübn. Midhurst, Sussex 6.viii.80.

BLAND, K.P. — One *Deileptenia ribeata* (Clerck) from Rowardennan, Stirling-shire viii.1980, an extremely local species in Scotland. One *Peridea anceps* (Goeze) from Perthshire v.1980, last recorded from the county in 1874.

BRITISH MUSEUM (NATURAL HISTORY) Six drawers from the National Collection showing variation in *Lycaena phlaeas* (L.). One drawer from the collection of the late Dr. J.W.O. Holmes, which included the syntypic series of *L. phlaeas* (L.) ab. *caeruleofasciata* Holmes.

BRITTON, M. Two drawers of British *Eupithecia*, mainly bred and including several local species.

CHALMERS-HUNT, J.M. A mint example of *Ourapteryx sambucaria* (L.) ab. *olivacea* Standfuss, taken by F.H. Clouter on the Isle of Sheppey, Kent (Plate 2, fig. 13). A male *Ematurga atomaria* (L.) ab. *unicolor* Staud. from Biggin Hill, Kent 12.v.80 (Plate 1, fig. 9).

CHATELAIN, R.G. — Some local and aberrant moths taken during 1980 including a pale straw coloured male *Apamea anceps* (D. & S.) from Eynsford, Kent and *Heliophobus reticulata* Goeze from Portland, Dorset.

CRASKE, R.M. Butterfly aberrations taken in Sussex during 1980 included an extreme male example of *Polyommatus icarus* (Rott.) ab. *radiata* Courv. (Plate 2, fig. 16) and a gynandromorph (Plate 2, fig. 17).

CRIBB, P.W. A halved gynandromorph of *Gonepteryx rhamni* (L.) taken on Box Hill, Surrey by John Searle. Some extreme bred aberrations of *Melitaea cinxia* (L.), one showing a large area of homeosis. Ventnor vi.1961 (Plate 1, fig. 7).

DYSON, R.C. — A drawer of mainly bred *Hadena perplexa* (D. & S.) from many localities in Great Britain and Ireland well illustrating the various colour forms of this species.

ELLIOTT, B. A series of *Venusia cambrica* Curtis from Derbyshire ranging from ab. *lofthousei* Prout to the melanic ab. *bradai* Prout. A variable series of *Antitype chi* (L.) from Derbyshire. An extreme aberration of *Artica caja* (L.) having uniform brown forewings and blue-black hindwings, taken at light in the Norfolk Broads during July 1980 (Plate 1, fig. 3). A series of *Spilosoma luteum* Hufn. ab. *zatima* Cramer bred from a heavily marked female from Lincolnshire.

HALL, N.M. and BRITTON, M.R. — Two drawers of moths from Cork, Kerry, and Clare viii.1980, including many Irish specialities.

HARMAN, T.W. From Sandwich Bay, Kent 15.viii.80, single examples of *Scopula rubiginata* (Hufn.) and *Heliothis peltigera* (D. & S.). From Westbere, Kent: the third authentic record from Kent of *Rhyacia simulans* (Hufn.) and two specimens of *Lithophane leautieri hesperica* Boursin.

HARMER, A.S. — A male *Diachrysa orichalcea* (F.) from Lymington, Hants 5.ix.80. A selection of Lepidoptera including many fine aberrations; particularly noteworthy were a female *Pyronia tithonus* (L.) ab. *postlanceolata* Leeds (Plate 00, fig. 00), and a male *Anthocharis cardamines* (L.) ab. *reducta* Masowicz + *crassipuncta* Mezger + *striata* Pionneau (Plate 1, fig. 10).

HEAL, N.F. — *Heterogenea asella* (D. & S.) from Park Wood, Kenardington, Kent, and a *Rhodometra sacraria* (L.) from Detling Hill, Kent, 10.viii.80.

HIGGS, G.E. — Two specimens of *Hypena obsitalis* (Hüb.) from Alderney, Channel Islands in August 1980 and two specimens of *Mesoligea furuncula* (D. & S.) ab. *latistriata* Hoffmeyer and Knudson from Ross Sands, Northumberland 4.viii.1978 (Plate 1, fig. 8).

HORTON, Dr. G.A. NEIL.—A case of Lepidoptera collected during 1979 and 1980 from Monmouthshire, including several local species and the following new additions to the vice county — *Hoplodrina ambigua* (D. & S.), Usk, 3.x.79; *Photedes fluxa* (Hübner), 2.viii.80; *Eupithecia pusillata* (D. & S.), Usk, 1.viii.80. A small selection from West Sutherland included *Eupithecia pygmaeata* (Hübner) from Tongue 18.vi.80.

LANE, C.—A case of Noctuidae and Geometridae all bred during 1979 and 1980 from Hampshire and Kent.

LANGMAID, Dr. R.—One *Eublemma parva* (Hübner) Southsea, Hants 7.viii.80.

LIPSCOMBE, Maj.-Gen. C.G.—A small, but fine selection of aberrant butterflies included two outstanding varieties of *Maniola jurtina* (L.): ♀ ab. *posttauro-lancea* Leeds, Wilts. 1.ix.1980 (Plate 1, fig. 1), and ♀ ab. *anommata* Verity, Wilts. 1.ix.1980 (Plate 1, fig. 5).

PAYNE, J.H.—A bred series of *Leptidea sinapis* (L.) ab. *brunneomaculata* Staud. showing colour variation, especially in the apical blotch of the male. Bred specimens of a pale coloured form of *Smerinthus ocellata* (L.)

PEET, Dr. T.N.D.—A selection of less common Lepidoptera from Guernsey, Channel Islands, this included three species which are not resident on the English mainland: *Petrophora peribolata* Hübner, *Trigonophora flammea* (Esp.) and *Hypena obsitalis* (Hübner).

PELHAM-CLINTON, E.C.—A dark specimen of *Trichopteryx carpinata* Borkh.) captured by I.C. Christie at Rowardennan, Stirlingshire on 22.iv.80 (Plate 2, fig. 14).

PICKERING, R.R.—A specimen of *Parascotia fuliginaria* (L.) taken at Aldwick Bay, Sussex 19.viii.80 by Major Philips and a male *Tyta luctuosa* (D. & S.) from Isleworth, Middlesex viii.78.

PICKLES, A.J. and C.T.—A drawer of moths bred during 1980 included a variable series of *Xanthia ocellaris* (Borkh.) from Suffolk and the following migrants, *Heliothis peltigera* (D. & S.) Swanage, Dorset 3.ix.80 and Lymington, Hants 13.vi.80; and a male *Diachrysia orichalcea* (F.) Lymington, Hants 1.ix.80.

PORTER, J.—One *Mythimna albipuncta* (D. & S.) from Dungeness, Kent 6.ix.80.

PRATT, C.R.—Distribution maps of the county of Sussex, being part of a new local history of Lepidoptera to be published shortly.

REVELS, R.C.—One drawer of butterfly aberrations caught or bred during 1980 including several extreme *Lysandra coridon* (Poda), one of these an ab. *melaina* Tutt is depicted on Plate 2, fig. 2. Also depicted is a radiated underside of *Lysandra bellargus* Rott. which hatched from a cooled pupa (Plate 2, fig. 1).

RICHARDSON, N.A.—An extreme aberration of *Euxoa nigricans* L. taken in Cambridgeshire 13.viii.80.

RUSSWURM, A.D.A. and MIDDLETON, H.G.M.—A display of British butterflies including many fine forms and extreme aberrations taken during 1980 in Dorset and Hampshire; of special interest was a female *Melanargia galathea* L. ab. *nigricans* Culot taken by T.M. Melling at Portland 1.viii.1980 (Plate 1 fig. 2), and a *Lysandra coridon* (Poda) ab. *inaequalis* Tutt also from Portland, Dorset 9.viii.1980 (Plate 2, fig. 18).

SIDDONS, P.N.—A melanic example of *Boloria selene* (D. & S.) captured in Cornwall 5.vi.1973 (Plate 1, fig. 6).

SIMSON, Brig. E.C.L.—A large and comprehensive exhibit of the British *Eupithecia* and some of the local races.

SKINNER, B.—Lepidoptera taken or bred during 1980 included a series of *Xestia alpicola alpina* Humph. & West. from Perthshire and Aberdeenshire, and two examples of *Pelosia obtusa* (H.S.) from the Norfolk Broads.

SOKOLOFF, P.A.—The fourth Kentish specimen of *Rhydas simulans* Hufn. taken at Orpington 14.ix.80.

STERLING, Col. D.H.—*Rhodometra sacraria* (L.) from Leckford, Hants, one 15/16.viii.80, one 15/16.x.79. One *Enargia paleacea* (Esp.) from Winchester, Hants 10/11.viii.80, one ♀ *Eupithecia abietaria* (Goeze) also from Winchester 18/19.vi.80.

TORLESSE, Rear Admiral A.D.—The second British record of *Syngrapha circumflexa* (L.) taken at Sway, Hants 29.vii.80. The first record of this migrant species was from Essex about 1802.

TREMEWAN, W.G.—Aberations of British *Zygaena* as follows. *Z. trifolii palustrella* Verity ab. *lutescens* Cockerell and confluent forms from Surrey; *Z. filipendulae anglicola* Tremewan ab. *aurantia* Tutt from Surrey and ab. *flava* Robson from Cornwall.

TUBBS, R.S.—An exhibit showing research into the genetics of aberrations of three species of British butterflies: *Pieris napi* (L.) ab. *fasciata* Kautz. *Hipparchia semele* (L.) ab. *holanops* Brouwer, and *Aphantopus hyperantus* (L.) ab. *arete* Muller.

WATSON, R.W. (National Collection)—Several drawers of aberrant Lepidoptera including a number of historic and unusual varieties acquired by the Watson Trust for Entomology either by purchase or donation. One of these is an unusual underside variety of *Apatura iris* (L.) ab. *isolata* Cabeau, Kingschase, Berks. bred vii.1980, having the markings asymmetrical (Plate 1, fig. 4).

WILD, E.H.—A small selection of moths taken or bred during 1980 and including the following migrants: *Rhodometra sacraria* (L.) from Selsdon, Surrey 15.viii, *Mythimna albipuncta* (D. & S.) from St. Lawrence, I.O.W. 10.ix, and a short series of *Heliothis peltigera* (D. & S.) bred from larvae collected at Dungeness, Kent in September.

WINTER, P.G. Lepidoptera from South-east and North-east Yorkshire taken or bred during 1978-1980. Most of the species shown are rarely met with in these vice counties, of particular interest were *Tethea or* (D. & S.) from near Scarborough, *Deileptenia ribeata* Clerck from near Pickering, *Odontotia carmelita* (Esp.) from near York, *Photedes fluxa* (Hübner) and *Amphipyra berbera svenssoni* Fletcher both from the same locality near York, and *Eupithecia insigniata* (Hübner) from Murston. Also included was a fine specimen of *Hippotion celerio* (L.) taken at Rudston, near Bridlington by A.S. Ezard 19.ix.80.

YOUNG, L.D.—A female *Polyommatus icarus* (Rott.) and twenty bred specimens from the first generation exhibiting enlarged forewing spots and 'costajuncta' tendencies. Eight generations of *Lysandra bellargus* (Rott.); the 'discoelongata' varieties appearing in the F.1., F.4., and F.6. generations.

MICROLEPIDOPTERA

AGASSIZ, Rev. D.J.L.—*Swammerdamia passerella* Zett. (= *nanivora* Stt.): a series bred from *Betula nana* found in the Highlands of Scotland, with photograph of the larva. *S. pyrella* Vill. and *S. caesiella* Hb. were included for comparison. *Agonopterix prostratella* Constant, a specimen taken in Dorset in 1970.

ALLEN, Dr. A.A.—The following all taken or bred in 1980. *Bohemmania quadrimaculella* (Boheman), Brownsea Island, Dorset, 20.viii. *Lyonetia clerkella* (L.), Reigate Heath, Surrey, bred birch, 13.viii. *Digitivalva pulicariae* (Klimesch), Brownsea Island, Dorset, 23.viii. *Stephensia brunnichella* (L.), Hackhurst Downs, Surrey. *Paracystola acroxantha* Meyrick, Dawlish, Devon, one of eight captured 21.vii.-9.viii. *Depressaria chaerophylli* Z., Shaldon, Devon, bred larva, viii. *Monochroa tenebrella* (Hbn.), Gribben Head, Cornwall, 25.vii. *Psoricoptera gibbosella* (Z.), Pluckley, Kent, 15.viii. *Anacamptis blattariella* (Hbn.), Brownsea Island, Dorset, bred birch, 30.vii. *Brachmia gerronella* (Z.), Brownsea Island,

Dorset, 23.viii. *Batrachedra praeangusta* (Haworth), Brownsea Island, Dorset, 23.viii. *Mompha locupletella* (D. & S.), Brownsea Island, Dorset, 29.v. *Scythris grandipennis* (Haworth), Little Haldon, Devon, 27.vii. *Dichrorampha alpinana* (Tr.), Dawlish Cliffs, Devon, 9.viii. *Epiblema foenella* (L.), Dawlish, 25.vii. *Rhyacionia pinicolana* (Doubl.), Brownsea Island, bred larva on pine, 30.v. *Mecyna asinalis* (Hbn.), Dawlish, 7.viii. *Agdistis bennetii* (Curtis), Brownsea Island, to actinic light, 22.viii.

APPLETON, D. - *Ypsolopha mucronella* (Scop.), Ventnor, Isle of Wight, two bred 25.28.viii.80 from young larvae found on spindle. *Pterophorus spilodactylus* Curtis, Isle of Wight, two bred 13.16.viii.80, from pupae found on *Marrubium*. *Pseudosciaphila branderiana* (L.), Botley Wood near Fareham, Hants, one bred 28.vi.80, from pupa found in spun aspen leaf.

BLAND, Dr. K.P. - *Triaxomera parasitella* (Hbn.), Balmaha, Loch Lomond, at m.v. light 2/3.vi.80, only third Scottish record. *Pancalia leuwenhoekella* (L.), Teviothead, Roxburghshire, 11.v.80. *Apotomis infida* (Hein.), Ettrick Marsh, Selkirkshire, at m.v. light, 3/4.vii.79 (Plate 2, fig. 20); habitat extensive marsh with various species of *Salix*; previously only known as British from two specimens taken at Rannoch in 1919. *Capperia britanniodactyla* (Greg.), Blackford Hill, Edinburgh, 5.vii.80; one old Scottish record. *Blastobasis decolorella* (Woll.), Blackford, Edinburgh, 5.vi.80; now widespread in southern Scotland. *Micropteryx thunbergella* F., Methven Wood, nr. Perth; previously only known in Scotland from Argyll (v.c.98) and Dumfriesshire (v.c.72). *Cryptoblabes bistriga* Haw., Blair, Loch Lomond, at m.v. light, 27/28.vi.80; few Scottish records. *Metzneria aprilella* H.-S. shown as *M. neuropterella* (Zell.), Easton Royal, Wiltshire, at m.v. light, 25.vii.80. *Eutromula pariana* (Clerck), Blackford, Edinburgh, reared 6.viii.80, rediscovered in Edinburgh after many years apparent absence. *Stigmella basiguttella* (Hein.), Creinch, Loch Lomond, vacated mine in oak, 11.x.80; most northern record and only second Scottish record.

BURTON, G.N. - *Nomophila noctuella* (D. & S.), Minster-in-Sheppey. Kent, two, 3.x.80.

CHALMERS-HUNT, J.M. - (1) Two drawers containing all 104 species of British Coleophoridae except *Coleophora lassella* Stdgr., *C. vulnerariae* Z. and *C. antennariella* H.-S. (2) *Lampronia flavimitrella* Hbn., Hoads Wood, Kent, a female netted 24.v.80; only the second British record.

EMMETT, Lt. Col. A.M. - (1) CUMBRIA *Stigmella svenssoni* (Johansson) A series of 11 reared 22.iv-9.v.80 from larvae collected at Arnside Knott on 13.ix.79, where it was plentiful. (2) ISLE OF MAN Species reared in 1980 from larvae collected 15-20.ix.79 and thought to be new to the island. *Stigmella auritella* (Skala) A series of 4 reared 2-10.v. *S. myrtillella* (Stainton) A series of 15 reared 30.iv-18.v. *Phyllonorycter mespilella* (Hübner) One reared 10.iv. *P. salicicolella* (Sircom) One reared 16.iv. *Epinotia subocellana* (Donovan) One reared 19.iv. (3) SCOTLAND *Stigmella betulicola* (Stainton) f. *nanivora* Peterson A series of 3 reared 23-30.iv.80 from larvae collected by the Rev. D. J. L. Agassiz on the mountains above Alvie, Inverness-shire. (4) IRELAND *Coleophora frischella* (L.) A series of 7 taken 1-6.vi.68 and one 6.vi.70 at Ballyconneely, Co. Galway, believed to be new to Ireland. The moths had been misidentified as *C. deauratella* Lienig & Zeller, of which a series of 11 taken at Parkeston, Essex on 19-27.vii.80 were shown for comparison. (5) SUFFOLK *Coleophora chalcogrammella* Zell. A series of 7 reared 13.vii-5.viii.80 from larvae collected on 21.v at Elvedon. (5) ESSEX Rare or underrecorded species encountered in 1980 whilst making records for the county list of Microlepidoptera. Distribution maps were given for some species. *Bohemannia quadrimaculella* (Boheman) Two taken 18.viii at Pods Wood, Messing, with map: the second record for the county. *Ectoedemia agrimoniae* (Frey) A series of 4 reared 23.vi-7.vii from Silver Street: new to North Essex (VC 19). *Stigmella samiatella* (Zell.) Single specimens reared on 14.iv and

3.viii from Great Holland, with map: new to North Essex (VC 19). Only 4 other British specimens are known. This species, which is the most common of the *atricapitella* group on the Continent, is well-established in a very restricted area in north-east Essex. *S. minusculella* (H.-S.) Two reared 13-14.iv from a locality in north-east Essex. These are believed to be the first British specimens for over 50 years. *Lampronia morosa* Zell. A series of 4 taken 23.v at Leigh-on-Sea, with map. *Phyllonorycter ulicicolella* (Stainton) 13 specimens from 9 dispersed localities with map, showing that this elusive species is widespread in the county. *Tinagma ocnerosomella* (Stainton) Two taken 23.vi at Purfleet. New to Essex. *Argyresthia ivella* (Haw.) A series of 5 taken 17.viii at Woodham Walter, with map: the first Essex record for over 40 years. *Coleophora prunifoliae* Doets A series of 9 reared 3-13.vii from South Benfleet, with map and notes on its pre-hibernation habits. It appears to be widespread and locally common in south and east Essex. *C. adjectella* H.-S. A series of 5 reared 7-14.vii from South Benfleet, with map. It appears to be confined in Essex to the south-east, where it is locally common. *C. troglodytella* (Dup.) A series of 3 reared 12-21.vii from Leigh-on-Sea: the first confirmed record for South Essex (VC 18) owing to past confusion with *C. trochilella* (Dup.) *Elachista subocellea* (Steph.) One taken 17.vii at Alphamstone, with map: the fourth county record. *Monochroa lucidella* (Donovan) Series, each of 4, from Matching Green (4.vii.79) and Great Holland Pits Nature Reserve (15.viii.80), with map. *Caryocolum visciatella* (Stainton) Pairs, each reared 24-25.vi, from Newport and Matching Green, and one captured 19.vii at Great Oakely, with map showing its apparently sudden extension of range in Essex. *Cochylidia heydeniana* (H.-S.) One reared 17.viii from Purfleet: the first recent record. *Catoptria falsella* (D. & S.) A series of 9 captured 23.vii on a dis-used, moss-covered airstrip at Bradwell-on-Sea, where it was abundant. *Oxyptilus parvidactylus* (Haw.) One taken 28.vi at Grays Chalk Pit: the third Essex record. *Pterophorus baliodactylus* Zell. One taken 31.vii at Grays Chalk Pit: the second Essex record. (6) Vice-county maps of the British Isles showing the number of species of Lyonetiidae, Gracillariidae (less Lithocolletinae) and Phyllocnistidae recorded in 1977 and 1980 with a request for additional records.

FAIRCLOUGH, A.J. and R.—Collection in six drawers containing 101 of the 118 forms of *Acleris cristana* (D. & S.) so far named.

FENN, J.L. and SATTLER, K.—The first recorded British specimens of *Scythris inspersella* (Hbn.), collected as adults and reared from larvae found on Rosebay Willowherb (*Epilobium angustifolium*) in Norfolk, vii and viii.1980.

HEAL, N.F.—All from Kent unless otherwise stated. *Coleophora linosyridella* Fuchs, cases taken 1978 at Shellness were not bred and identification was not possible until 1979 when 9 were bred 17/27.vii.79 from cases collected 1.vi.79, and 1980 one only bred 29.viii.80 from cases collected 27.v.80; exhibitor found the species at Nagden Marshes, Graveney, and Canvey Island, Essex, and exhibited 15 young overwintering cases from Nagden Marshes, 7.x.80, found on leaves of *Aster tripolium* on edge of saltmarsh. *C. vibicigerella* Z., Shellness, ten bred 6-19.vii.80 from cases collected on *Artemisia maritima*, 24-27.v.80. *C. machinella* Bradley, Shellness one case on *Artemisia maritima*, 24.v.80, not bred. *Agriphila selasella* Hbn., Higham Canal, 8, 27.viii.80, Park Wood, Kenardington, 9.viii.80, Detling Hill, Maidstone, 10/14.viii.80; all at m.v. *Agonopterix putridella* D. & S., Nagden Marshes, Graveney, nine bred 28.vii-1.viii.80 from larvae found on *Peucedanum officinale*, 22.vi.80. *Phyllonorycter cydoniella* D. & S., Darenth Wood, many bred 16.iv-5.v.80, from mines on *Malus* collected 27.x.79. *Narycia monilifera* Geoffroy, Winchcombe NNR, Crundale, bred 16.vi.80 from case on oak tree, 31.v.80. *Epichnopterix retiella* Newman, Shellness, one flying in sunshine, 27.v.80, and vacated case, 24.v.80. *Epinotia caprana* F. f. *sciurana* H.-S., Dungeness, 20.ix.80. *Ethmia bipunctella* F., ab. with middle projection to lower

edge of black costal half of forewing and terminal dots absent, Dungeness, 15.v.79.

HECKFORD, R.J.—*Caloptilia azaleella* (Brants), Plympton, Devon, 5.ix.80. *C. cuculipennella* (Hbn.), Bantam, Devon, bred from *Ligustrum*, 9.ix.80, emerged, 10-14.ix.80. *Phyllonorycter viminetorum* (Stt.), Plympton, Devon, bred from *Salix viminalis*, emerged 27-30.viii.79. *Digitivalva perlepidella* (Stt.), Arundel, Sussex, 17.vi.80; new to Sussex. *Coleophora prunifoliae* Doets, found as new to Britain by the exhibitor with specimens of the first recorded British specimens, bred from *Prunus spinosa*, 29.iv.77, emerged 22.vi-4.vii.77, Whitsand Bay, Cornwall; also specimens, all bred from *P. spinosa*, from three separate localities in Devon, namely Devils Point, Plymouth, Saltram, Plymouth and from near Mothecombe, all bred during vi.1980. *C. coracipennella* (Hbn.), Longbeech, New Forest, Hants, bred from *Malus*, emerged 26.vi.78; Petworth, Sussex, bred from *Prunus spinosa* 24.v.80, emerged 13-30.vi.80; Chichester Gravel Pits, Sussex, bred from *P. spinosa* 13.vi.80, emerged 14.vii.80. *C. cerasivorella* Packard. Specimens bred from *Malus* and *Crataegus* from Cornwall, Devon and Sussex; they were exhibited for comparison with *C. prunifoliae* and *C. coracipennella* and cases of all species were shown for comparison. *C. lassella* Stgr., Predannack, Cornwall, 15.v.77; believed to be the third or fourth English locality only; new to Cornwall. *C. trifolii* (Curtis), Plympton, Devon, 1.viii.80. *Cosmiotes consortella* (Staint.), Plympton, Devon, 11.iv and 14.viii.80. *Depressaria pulcherrimella* Staint., Plympton, Devon, bred from *Conopodium majus* 31.v.80, emerged 17-21.vi.80, not previously recorded from Devon; Harting Down, Sussex bred from *Pimpinella saxifraga* 16.vi.80, emerged 12.vii.80. *Agonopterix astrantiae* (Hein.), Sussex, bred from *Sanicula europaea* 20.vi.80, emerged 17.vii.80; first recorded specimen bred in Britain, and new to Sussex. *A. carduella* (Hbn.) Ventnor, Isle of Wight, bred from *Centaurea scabiosa* 25.vi.80, emerged 27.vii.80. *Syncopacma vinella* (Bankes), Ditchling, Sussex, bred from *Genista tinctoria* 21.vi.80, emerged 19-23.vii.80; the larvae were dark grey and not whitish as described by Meyrick. *Lobesia occidentis* Falk., Arundel, Sussex, 17.vi.80. *Diasemiopsis ramburialis* (Dup.), Beaulieu Road Station, New Forest, Hants, 19.ix.80. *Cryptoblabes gnidiella* (Mill.), Plympton, Devon, bred from pomegranate, emerged 8.i.80.

HORTON, Dr. G.A. NEIL—*Aethes tesserana* D. & S., S. Monmouthshire, 26.v.80, first v.c. record. *Epiblema costipunctana* Haw., S. Monmouthshire, 26.v.80. *Dichrorampha sequana* Hbn., Usk, Monmouthshire, 24.v.80. *D. flavidorsana* Knaggs, Usk, Monmouthshire, 25.viii.80. *Ancylis myrtillana* Treit., Pontypool, 25.v.80. *Epinotia cruciana* L., S. Monmouthshire, 24.vi.80. *E. brunnichana* L., S. Monmouthshire, 28.vii.80. *E. ramella* L. f. *costana* Dup., 15.viii.80. *Eucosma campoliliana* D. & S., Usk, Monmouthshire, 8.viii.80. *Cydia servillana* Dup., S. Monmouthshire, 3.v.80. *Zeiraphera ratzeburgiana* Ratz., S. Monmouthshire, 15.vii.80. *Leioptilus tephradactyla* Hbn. S. Monmouthshire, 24.vi.80, first v.c. record. *L. osteodactylus* Z., S. Monmouthshire, 5.vii.80, first v.c. record. *Apotomis sororculana* Zett., Airdtorrisdale, Sutherland, 10.vi.80.

JOHNSON, P.J.—*Mompha ochraceella* (Curtis), Horseheath, Cambs., bred from *Epilobium*, 13-19.vi.78. *Depressaria pimpinellae* Z., bred from *Pimpinella* flowers, Duddenhoe End, Essex, 31.viii.80 and Great Benysh Wood, Essex, 1.ix.80.

LANGMAID, Dr. J.R.—*Depressaria/Agonopterix* Quiz. A drawer containing thirty specimens of the above genera with each specimen numbered. Some sheets of paper available for members to write down their identifications. The correct identifications of each moth revealed at 2 p.m. so that members could check their answers. It is hoped that the quiz will generate interest in this group of moths.

PELHAM-CLINTON, E.C.—Microlepidoptera collected during 1980. *Bucculatrix* sp. on *Myrica gale*, Llanbedrgoch, Anglesey, mines and moulting cocoons of

larvae of an unknown species, not yet reared to the adult stage. *Leucoptera waillesella* (Staint.), Thorney I., Sussex, bred from pupae on *Genista tinctoria*. *Caloptrilia rufipennella* (Hbn.), Stenton, East Lothian and Abercorn, West Lothian, bred from larvae on *Acer pseudoplatanus*. *Yponomeuta malinellus* Z., Sevington, Kent, bred from larvae on *Malus. Exaeretia allisella* Stt., Winchburgh West Lothian, one, 25.vii.80 in light trap. *Agonopterix pulverella* (Hbn.), Ditchling, Sussex, bred from larvae on *Genista tinctoria*. *Synopacma vinella* (Banks), Ditchling, Sussex, bred from larvae on *Genista tinctoria*. *Dichrorampha sylvicolana* Hein., Ditchling, Sussex, 21.vi.80. *Apotomis infida* (Heinrich), Ettrick, Selkirk, 18.vii.80 at light; discovered in this locality recently by K. P. Bland; for comparison, *A. semifasciana* (Haw.), Tayvallich, Knapdale, Argyll, 6.vii.74, the only known Scottish specimen.

PICKLES, A. J. and C. T.—*Palpita unionalis* Hbn., Lymington, 1.viii.80.

SIMPSON, Dr. A. N. B.—*Niditinea piercella* (Bent.), nr. Stratford on Avon, Warks., ex Kestrel's nest, collected x.1979, emerged vi.1980. *Tinea columbariella* (Wocke), ex Kestrel's nest as above. *Amphibatis incongruella* (Z.), Hartlebury Common, Wores., iv.1980. *Exaeretia allisella* (Staint.), Ryton on Dunsmore, Warks., larva on *Artemisia vulgaris* collected iv.1980, hatched viii.1980. *Depressaria douglasella* (Staint.), nr. Oxwich Point, Gower, Glamorgan, bred ex larva on *Daucus*, vi.1980. *D. weirella* (Staint.), Powick, Wores., ex larva on *Anthriscus sylvestris*, v.1980. *D. ultimella* (Staint.), nr. Stourport, Wores., ex larva on *Oenanthe phellandrium*, viii.1979. *Coleophora versurella* (Z.), Worcester City, on *Atriplex patula*, x.1979. *C. serphyllietorum* Hering (gen. det. R. W. Uffen), Cadgwith, West Cornwall vii.1976. *Celypha woodiana* (Barr.), D. Broughton, Wores., ex larva v.1980. *Dichrorampha consortana* (Steph.), Cardiganshire, vii.1980. *Chionodes distinctella* (Z.), Hartlebury Common, Wores., vii.1979. *Pexicopia malvella* (Hbn.), Llanrhidian Marshes, Gower, Glamorgan, bred ix.1979, ex larva on *Althaea officinalis*. *Gelechia nigra* (Haw.), D. Broughton, Wores., ex larva on aspen, v.1978. *Telephila schmidtliellus* (Heyd.), Oxwich Point, Gower, Glamorgan, ex larva on *Origanum*, vi.1980. *Ephestia cautella* (Walker), Birmingham, xi.1978. *Aglossa pinguinalis* (L.), Powick, Wores., vii.1980. *Apomyelois neophanes* (Durrant), Wores., ex larva on *Daldinia concentrica* on dead birch, iv.1980.

SOKOLOFF, P. A.—A culture of *Tineola bisselliella* Hum., showing larvae, cocoons and imagines; a hank of wool damaged by the larvae of this species was also shown, together with a cabinet specimen of *Noctua pronuba* L. upon which an escaped larva was feeding, constructing an external feeding tube from thoracic hairs of the *pronuba*. *Scythris grandipennis* Haw., Dartford, Kent, bred *Ulex minor*. A selection of moths bred from a small sample of yarrow roots taken from Ruxley pits Kent, including the *Dichrorampha* species *sequana* Hbn., *gueneana* Obr., *plumbana* Scop. and *petiverella* L. Selection of moths bred following the 1979 field meeting at Darenth, Kent including *Ectoedemia agrimoniae* Frey (agrimony), *E. angulifasciella* Staint. (rose), *Cochylis roseana* (Haw.) (Teasel), *Phyllonorycter nigrescentella* Log. (Bush Vetch) and *Coleophora squamosella* Staint. (Blue Fleabane). Various specimens captured during 1980, including *Argyresthia sorbiella* Tr. (Orpington, Kent), *Anania verbascalis* D. & S. (Shorne, Kent), *Yponomeuta irrorella* Hbn. (High Halstow, Kent); forms of *Epinotia brunnichana* L., from Haltwhistle, Northumberland, including two examples of f. *brunneodorsana* Sheldon, described in the literature as "unusual and rare"; *Thisanotia chrysonuchella* Scop., near Wye, Kent and a short series of *Hypochalcia ahenella* D. & S. from Shoreham, Kent.

STERLING, Col. D. H.—A selection of *Ypsolopha* from Hampshire: *Y. mucronella* (Scop.), *Y. nemorella* (L.), *Y. dentella* (F.), *Y. scabrella* (L.), *Y. horridella* (Tr.), *Y. alpella* (D. & S.), *Y. sylvella* (L.), *Y. parenthesesella* (L.), *Y. ustella* (Clerck), *Y. sequella* (Clerck), *Y. vittella* (L.).

FOREIGN MACRO-LEPIDOPTERA

The large displays of foreign Lepidoptera were very welcome at the end of a season which was unfavourable to native species. Pride of place was again taken by twelve drawers of Scandinavian Lepidoptera shown by STIG TORSTENIUS and B. ASHBY from the collection which the former has given to the Society, and which he was this year able to present in person and to discuss with many members. The drawers were accompanied by a panel featuring the mountain regions of Lapland and the last forests before the treeless tundra of the far north, which are distinctive Scandinavian habitats.

Other, more southerly, Palaearctic areas were also well represented. A.C.P. HARBOTTLE showed a large number of species collected 2-17.viii.80 in Spain, including a curious example of *Pandoriana pandora* D. & S. which may be referable to the melanic f. *dacia* Hormuzaki, equivalent to f. *valesina* Esp. in *Argynnis paphia* L., but occurring in both sexes. There was also a Skipper which is either *Gegenes nostradamus* F. or *Borbo borbonica* Zell. which are both rare species in Spain. (Editor: unfortunately no note of this exhibit has reached me.) R.F. BRETHERTON showed four species of *Erebia* caught in 1979 in the Picos de Europa and the Sierra de Albarracín, and a short series of *Eurodryas desfontainii* Godart bred in England in June 1980 from larval webs found in prov. Burgos, north Spain, in the previous July, with examples of *E. aurinia beckeri* H.-S. from south Spain and *E. aurinia aurinia* from Surrey, England, for comparison. He also showed from the French Pyrenees twelve *Erebia* species, of differing sub-species and forms, from the east and centre of these mountains; and also an extreme male albino specimen of *Melanargia lachesis* Hübn., from Vernet-les-Bains, Pyr.-Or., apparently hitherto undescribed.

R.J. REVELL had over 30 species of Heterocera and three species of Rhopalocera collected in 1980 mainly in the Dordogne region of France; and the butterflies and *Zygaeninae* of the Alps of Savoie and Haute Savoie were thoroughly illustrated by very large displays by M.S. HARVEY (71 species) and by G.N. BURTON (over 40 species), both collected in August 1980. From further east, R.F. BRETHERTON exhibited on behalf of D.W. BALDOCK butterflies from the Greek island of Corfu, 18-31.viii.80. He showed 25 species, of which six have not previously been certainly reported from Corfu, and ten more were identified in the field, making a total of 35 species in this short visit late in the season. E.P. WILTSHIRE showed a collection of about 20 larger moths from Oman, S.E. Arabia (leg. T.B. LARSEN and M.D. GALLAGHER, 1979) and a map, illustrating the more Asiatic character of the fauna and flora of North Oman and the more African character of that of South Oman. Between the two provinces the severe deserts of the eastern Empty Quarter appear, from the moth collections, to form the faunistic frontier of Asia and Africa, rather than the Red Sea or the Persian Gulf. More generally, P.W. CRIBB showed 30 pairs or triples of European species which can be difficult to identify, with helpful notes on their distinctive characters and distribution.

From Palaearctic Africa T.B. LARSEN showed a specimen of *Heliothis peltigera* D. & S. captured at light in a wet locality in Morocco where various orchid species were common. It carries five pollinaria (the special detachable pollen sacs of orchids) firmly attached to its eyes – two on one eye, three on the other. The moth is of a form which frequently reaches Britain as a summer immigrant. From Tunisia W.G. TREMEWAN showed series of *Zygaena felix* Obth., *Z. thevestis* Stgr. (including cocoons), *Z. loyselii* Obth., *Z. orana* Dup., *Z. algira* Bdv., and *Z. favonia* Freyer (including cocoons). The first three species have not hitherto been recorded from Tunisia. He also had a rather battered bilateral gynandromorph of *Gonepteryx cleopatra* L., with the left side male and the right side female, taken on the Djebel Bou Kornine. All these were found in May 1980.

G.H.H. BROOME had 118 species of butterflies collected in the Transkei and Natal, South Africa xii.1979-ii.1980. These included *Papilio euphranor* Trimen, restricted to highland forests; *Graphium porthaon* (Hewitson), restricted to coastal northern Zululand; *Coeliades keithloa* (Wallengren), restricted to coastal forest of Natal and Transkei; *Colotis erone* (Angus), local in south and east Africa; *Tarucus bowkeri* (Trimen), confined to localities in Natal and Transvaal; *Harpenderys tsono* (Trimen) confined to Transkei and Lesotho; *Coenyrus hebe* (Trimen), restricted to the coast of Mozambique and Zululand. From tropical Kenya D.R. TREMBATH had a spectacular display of *Papilio*, *Charaxes*, and other butterflies (179 species in all), which filled five drawers; and from Brunei R. FAIRCLOUGH showed a number of striking Heterocera taken during a short visit in 1980.

American lepidoptera were represented by three Ctenuchid moths from the British Virgin Islands, shown by Dr J.A. LORIMER: *Horama pretus* Cramer, a close mimic of the stinging social wasp *Polistes crinitus* Felton; *Empyreuma pugione* (L.), which accurately mimics the wasp *Pepsis rubra* Drury; *Cosmosoma achemon* Fabr., usually seen on flower heads of *Compositae* or *Lantana*. For the North American mainland P.J. BAKER showed 108 of the 126 species of butterflies which have been recorded from the state of New Jersey, U.S.A., with a map showing the geological structure of the state in its bearing on the butterfly distribution. He noted that ten species were common to both Britain and New Jersey, though two of these, *Danaus plexippus* L. and *Cynthia virginianensis* Drury only as occasional trans-atlantic immigrants to Britain, and two others, *Pieris rapae* L. and *Thymelicus lineola* Ochs. only as a result of accidental introduction to New Jersey.

HYMENOPTERA (SYMPHYTA & ACULEATA)

ELSE, G.R. — (i) "Sphecid wasps recently added to the British list." During the last two years four sphecid wasps have been added to the British list. Three of these have been included in O.W. Richards's recently published Royal Entomological Society's Handbook (Scolioidea, Vespoidea and Sphecoidea, *Handbk Ident. Br. Insects* 6 (pt. 3 (b)), but the fourth, *Psen unicolor* (Vander Linden), was recognised too late for inclusion. *Crossocerus distinguendus* (Morawitz), 2 ♂♂, Faversham, Kent, 28.vii.79, L. Packer, and ♀, 24.vii.79, A. Glowlaski. The first British specimen was collected in Ewell, Surrey in the early 1970s by D.B. Baker, but the record was not published until very recently. L. Packer began to find examples in Kent in 1978 and has since discovered that the species is widely distributed and locally common in the county. *Passaloecus eremita* Kohl, ♀, Midhurst Common, West Sussex, 19.viii.78 and ♀, 19.viii.80, M. Edwards. First recorded in Britain from West Sussex (Crowborough Forest), by G.H.L. Dicker in 1979 and has subsequently been found by him in Kent where it seems to be widely distributed though local. *Psen atratinus* (Morawitz), 2 ♂♂, ♀, Luccombe Chine, nr. Shanklin, Isle of Wight, 30.vi.80; 2 ♂♂, Whale Chine, nr. Chale, Isle of Wight, 3.vii.80; ♂, Blackgang Chine area, nr Chale, 23.vii.80. All G.R. Else. First British specimen collected on the Isle of Wight in 1950 by O.W. Richards, but although provisionally identified at that time the record was not finally confirmed and published until 1980 in his Handbook. In 1977 a pair were collected by G.R. Else at Luccombe Chine, a few miles to the east of Richards's capture. In June-July 1980 members of the joint Bees, Wasps, and Ants and Diptera Recording Schemes' field trip to the Island recorded the species from three sites on the south coast. The wasp is unknown in Britain outside the Isle of Wight. On the Continent it is known to nest in dry, decayed wood, often in abandoned insect burrows, but in Britain it probably nests in dry stems (decaying timber being scarce in some of its localities). *P. unicolor* (Vander Linden), 2 ♂♂, 2 ♀♀ Whale Chine, 3.vii and 2 ♀♀, 23.vii.80; ♂, 2 ♀♀, Blackgang Chine area, 23.vii.80. All

G.R. Else. Only known in Britain from the south-west coast of the Isle of Wight. The first specimens were collected again by O.W. Richards in 1950, but were unfortunately misidentified as *P. spooneri* (Richards). They were taken with the original British *P. atratinus*, thus O.W.R. has the distinction of collecting two sphecids new to Britain in one day! No more examples were collected for the next thirty years, when in 1980 the species was found in four undercliff sites by the party mentioned above. In two of these sites it was locally abundant and flying with *P. atratinus* (which it far outnumbered). Both wasps seem to have a preference for damp spots. e.g. they have been observed alighting on Coltsfoot leaves adjacent to cliff seepages and flying low amongst *Juncus* and *Phragmites* (in the dead stems of which they probably nest).

(ii) "A selection of Aculeate Hymenoptera collected in Hampshire and on the Isle of Wight, 1980." Thirty-three species exhibited of which the following were of particular interest (all collected by G.R. Else, unless otherwise stated): *Methocho ichneumonoides* Latreille (Tiphidae), ♂ ♀, Blackgang Chine area, Isle of Wight, 23.vii, both from within a strong *Cicindela germanica* L. colony (upon the larvae of which the ♀ wasp almost certainly preys). *Podalonia hirsuta* (Scopoli) (Sphecidae), ♀, nr. Blackgang, I.o.W., the first Island record for many years; *Oxybelus mandibularis* Dahlbom, 2 ♀♀, heathland east of Beaulieu Road railway station, New Forest, Hants, 25.viii; *Ectemnius sexcinctus* (F.), ♀, Yarmouth dunes, I.o.W., 23.viii, visiting *Foeniculum vulgare* Mill. blossom, D.M. Appleton; *Diodontus tristis* (Vander Linden), 2 ♀♀, Luccombe Chine, nr. Shanklin, I.o.W., 2.viii; *D. insidiosus* Spooner, 2 ♀♀, heathland east of Beaulieu Road railway station, 25.viii; *Argogorytes fargeii* (Shuckard), 2 ♀♀, nr. Brighstone, Chilton Chine, I.o.W., 2.vii, visiting *Heracleum sphondylium* L. blossom; *Alysson lunicornis* (F.), 2 ♀♀, St. Helens, I.o.W., 27.viii (very few records this century); *Philanthus triangulum* (F.), ♂ ♀, I.o.W. coast, 3.vii, ♂ swept from *Armeria maritima* (Mill.) flowers. *Colletes marginatus* Smith (Colletidae) ♂ ♀, I.o.W. coast, 3.vii, ♂ swept from *A. maritima* flowers; *Andrena nigriceps* (Kirby) (Andrenidae), 2 ♂♂, Headon Warren, nr. Alum Bay, I.o.W., 5.vii and worn ♀, 9.viii, all on *Senecio* blossom; *A. minutuloides* Perkins, ♀, St. Catherine's Hill, nr. Winchester, Hants, 24.viii, swept; *Osmia xanthomelana* (Kirby) (Megachilidae), ♀, I.o.W. coast, 5.vi, visiting seepage at cliff base (about 16 specimens recorded on this date); *Coelioxys elongata* Lepeletier, ♀, Red Cliff area, nr. Sandown, I.o.W., 29.vi; *Stelis punctulatisima* (Kirby), ♀, Ventnor, I.o.W., 2.viii; *Nomada fucata* Panzer (Anthophoridae), ♀, St. Catherine's Hill, nr. Winchester, 24.viii, swept.

HALSTEAD, A.J.—(i) A nest of the social wasp *Dolichovespula norwegica* (F.) (Vespidae) collected from a clump of bamboo from the Royal Horticultural Society's garden, nr. Woking, Surrey, 11.vii.80. The exhibit also included 3 ♀♀, 5 workers, 3 ♂♂ from this nest.

(ii) Twenty-three sawflies, mainly from Surrey, 1980. Mostly common species and illustrating variation in Tenthredinidae.

McLEAN, I.F.G.—A mixed exhibit which contained two rare sphecids wasps: *Crossocerus leucostoma* (L.), ♂, Glen Tanar, Aberdeenshire, 31.v.80, swept; (recorded in Britain only from Scotland, Cumbria and the Isle of Man); *Pemphredon enslini* (Wagner), ♀, Blaisdon, Gloucestershire, 24.vii.80. This species has previously been collected in Britain from only two localities — 6 ♂♂, 2 ♀♀, Richmond, N.W. Yorks, 1903, A.J. Chitty, and a ♀, Whitchurch Down, Devon, 28.viii.72, G.M. Spooner.

MILES, S.R.—"Interesting species of Hymenoptera (Aculeata), taken during 1979-80", included the bees *Andrena proxima* (Kirby), ♂, Aldworth, Berks, 15.v; *A. lapponica* Zetterstedt, ♂ ♀, Fence Wood, Hermitage, Berks (♀ visiting *Vaccinium*), 24.iv.80; and *A. simillima* Smith, ♀, Abbotstone Down, nr. Alresford, Hants, 22.vii.79, on *Senecio* blossom. The latter is a particularly interesting record as in this country *A. simillima* is a very local coastal species, recorded from Kent,

Hampshire, the Isle of Wight, Devon, and Cornwall. Alresford is about 12 km inland. (Rev. F.L. Wain also collected *A. simillima* on Abbotstone Down on 17.vii.75.)

COLEOPTERA

ALBERTINI, M. - A single specimen of *Odontaeus armiger* (Sp.) found drowned in a Heath trap, Aston Upthorpe Downs, Berkshire, 26.vii.80. This rare scarabid is thought to feed underground on truffles and this may account for its rarity.

DARBY, M. - Four of the smallest members of our coleopterous fauna were exhibited. (i) *Ptilium exaratum* (Allibert), which is believed to be an extremely rare species, was found by the exhibitor in cow dung at Windsor, Berkshire on 18.ix.80. Although there are a number of specimens in old collections none have data and the only other definite record is from Knowle, Warwickshire.

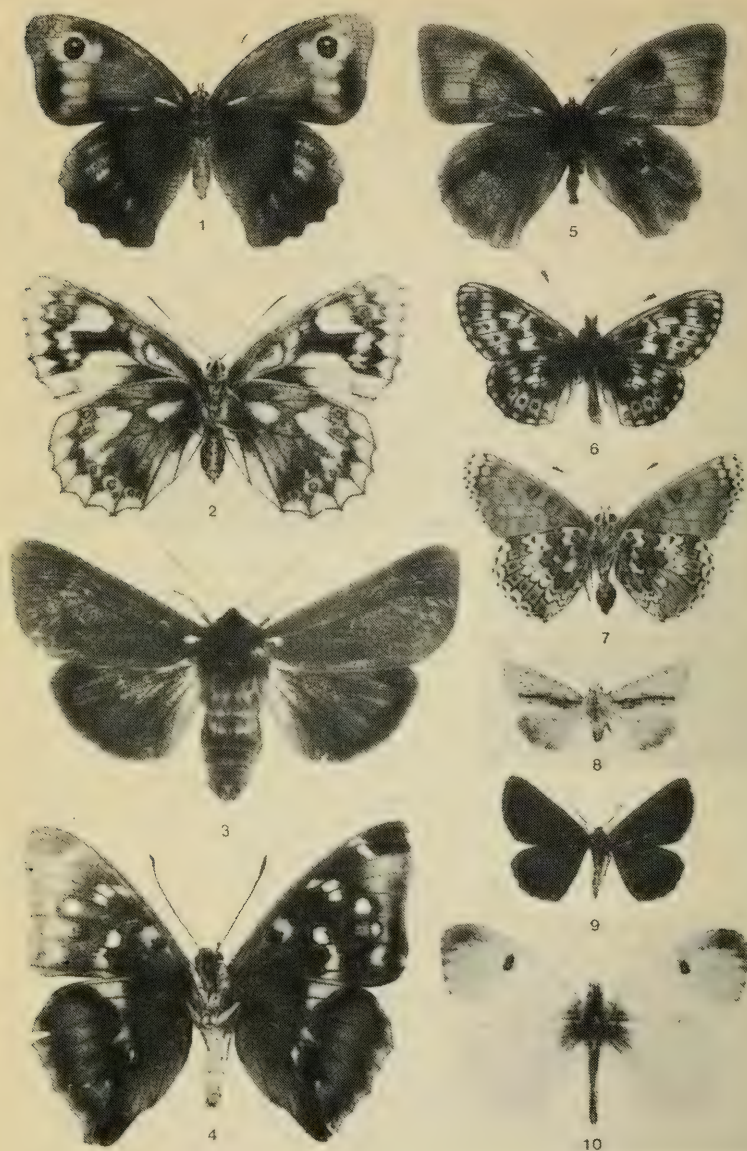
(ii) *Acrotrichis cognata* (Matthews) is another Ptiliid, and a series taken from a dead bird at Riccal, Yorkshire on 23.vi.80 was shown. All the specimens were female and investigations have shown that the males of this species are unknown. This species may be partially parthenogenetic.

(iii) *Acrotrichis chevroleti* (Allibert) is the smallest member of the genus and the specimen exhibited came from a compost heap at Ilketshall St Margaret, Suffolk in 1980. The only other records of this species are from Warwickshire and Yorkshire.

(iv) *Atomaria morio* Kolenati, one taken from a fungus in Windsor Forest on 8.xii.79. The species has been recorded twice before in Britain, from Windsor in 1928 and Monks Wood in 1965. In contrast to these species, two examples of the rare and distinctive *Lymexylon navale* (L.) were exhibited to show the great range of size in this species. The specimens were taken flying above freshly sawn timber in Windsor Forest on 1.viii.80.

HODGE, P.J. - A selection of British Coleoptera taken during 1979-1980. Among those exhibited were several species which had not been recorded previously from Sussex. These were *Atheta cribrata* (Kraatz), *A. boreella* Brundin, *A. obtusangula* Joy, *Aleochara sanguinea* (L.) (Staphylinidae), *Epuraea adumbrata* Mann. (Nitidulidae), *Stenostola dubia* Laich. (Cerambycidae) and *Rhinomacer attelaboides* F. (Nemonychidae). Another new record for Sussex, but this time of a vagrant species, was a specimen of the Curculionid *Sipalinus gigas* F. This species is a native of S.E. Asia and is much larger than any British weevil. It was found alive in a garden in Boreham Street, Sussex in 1979. A specimen of *Cis coluber* Abeille (Cisidae) was shown, this is the second Sussex record for this rare species. Among other interesting species exhibited were *Ptinus dubius* Sturm (Ptinidae), *Pityogenes chalcographus* (L.) (Scolytidae), *Nebria livida* (L.), *Dromius angustus* Brullé (Carabidae) and *Cassida murraea* (L.) (Chrysomelidae).

McCLENAGHAN, Dr I. - An exhibit of twenty-one local and uncommon species from South Essex. Most of the specimens were from Thorndon Country Park (TQ 69) and the neighbouring parts of Ingrave and Brentwood. Four of the species exhibited were new to Essex, these were: *Monotoma angusticollis* Gyll. (Rhizophagidae) taken from a nest of *Formica rufa* near Brentwood, *Orchesia undulata* Kraatz (Serropalpidae), *Orthoperus nigrescens* Steph. (Orthoperidae) and *Dienerella elongata* (Curtis) (Lathridiidae), these last three were from Thorndon Park. Three species were shown which are increasing their range in Britain, *Leistus rufomarginatus* Duftschmid (Carabidae) from Thorndon Park, *Harmonia 4-punctata* Pontoppidan (Coccinellidae) from a mercury vapour moth trap in Ingrave on 8.ix.76 and *Aulonium trisulcum* (Fourcroy) (Colydiidae) also from a light trap. Unknown in Britain before 1975 and also spreading is the *fasciato-punctata* form of the common coccinellid *Adalia bipunctata* (L.): the specimen



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Data in text under exhibitor's name.

1. *Maniola jurtina* ab. *postaurolancea* (C.G. Lipscombe). 2. *Melanargia galathea* ab. *nigricans* (Ruszwurm et al.). 3. *Arctia caja* (B. Elliott). 4. *Apatura iris* ab. *iolata* underside (R.W. Watson). 5. *Maniola jurtina* ab. *anommata* (C.G. Lipscombe). 6. *Boloria selene* melanic (P.N. Siddons). 7. *Melitaea cinxia* homeotic (P.W. Cribb). 8. *Mesoligea furuncula* ab. *latistriata* (G.Higgs). 9. *Ematurga atomaria* (J.M. Chalmers-Hunt). 10. *Euchloe cardamines* ab. *reducta* (A.S. Harmer).



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11. *Lysandra bellargus* ab. *radiata* (R.C. Revels). 12. *Lysandra coridon* ab. *melaina* (R.C. Revels). 13. *Ourapteryx samburcaria* ab. *olivacea* (J.M. Chalmers-Hunt). 14. *Trichopteryx carpinata* (E.C. Pelham-Clinton). 15. *Sipalinus gigas* (P. Hodge). 16. *Polyommatus icarus* ab. *radiata* (R.M. Craske). 17. *P. icarus* gynandromorph (R.M.C.). 18. *Lysandra coridon* ab. *inaequalis* (Russwurm et al.). 19. *Lampronia flavimitrella* × 2 (J.M. Chalmers-Hunt). 20. *Apotomis infida* × 2 (K.P. Bland). 21. *Cassida murraea* (P.Hodge). 22. *Adalia bipunctata* ab. *fasciatopunctata* (I. McLenaghan). 23a,b. *Lymexylon navale* (M. Darby).



shown was from Dagenham 19.iv.1978 (Plate 2, fig. 22). The rare Clerid *Paratillus carus* (Newman) was taken at the same locality. *Dermestes frischii* (Kugelann) a dermestid not usually found in domestic premises was exhibited. Many examples of this species had been found in the kitchen of a house in Gants Hill in the summer of 1980.

PHOTOGRAPHS

As usual, the number of members exhibiting photographs was small, but the quality and quantity of items in this section amply compensates for the small number of exhibitors. Richard Revels and Raymond Uffen must be singled out for the exceptional quality of their work.

HYDE, G.—Monochrome prints of various Lepidoptera, including Kentish Glory ovipositing, large copper, scarce swallowtail, brown hairstreak and marbled white.

MURPHY, Mrs. F.M.—Colour and monochrome prints of a variety of arachnids, including webs constructed by various species.

OATES, M.R.—Colour prints of an aberrant *Polygonia c-album* L.

D'DONNELL, D.J. A display of scanning electron micrographs illustrating how to distinguish between different genera of first instar larvae of Aphidiinae (Hymenoptera: Braconidae). Two characters, abdominal spines and tail structure, were used as examples to show the very clear differences which may be observed. The display included a picture of a larva of *Praon volucre* (Haliday) magnified over 1,000 times. This picture was used to indicate where the characters may be found on a complete larva. The rest of the display was arranged so that the same characters from different species could be compared with each other. Larvae of *Ephedrus cerasicola* Stary, *Aphidius matricariae* Haliday, *Trioxys pallidus* (Haliday), *Monoctonus cerasi* (Marshall) and *Monoctonus pseudoplatani* (Marshall) were illustrated.

The differences observed between the larvae of *Monoctonus cerasi* and *Monoctonus pseudoplatani* were greater than the differences between species in other genera. This may indicate that these two species have been incorrectly assigned to the same genus. This was the first comprehensive study of the larvae of these insects.

REVELS, R.C.—A large selection of colour prints of British butterflies, illustrating the complete life histories of several species.

TWEEDIE, M.W.F.—Photographs of butterflies in a rain forest in eastern Peru, including a remarkable cluster of Pierids and swordtails on contaminated mud. Also close-up head-and-thorax portraits of some common British moths.

UFFEN, R.W.J.—High magnification prints of transparencies taken by E.S. Bradford on the subject of leaf mines. Examples of the use of back lighting when photographing insects.

MISCELLANEOUS EXHIBITS

CHALMERS-HUNT, J.M.—A selection of old entomological trade catalogues.

DARBY, M.—The first minute book, probably of the Lancashire and Cheshire Entomological Society. Found in a second hand bookshop in Sheen. The first meeting was in 1877.

STUBBS, A.E.—A display on the Invertebrate Site Register, exhibited on behalf of the Nature Conservancy Council.

OBITUARIES

W. H. T. TAMS 1891-1980

Willie Horace Thomas Tams, who for more than half a century was a notable personality in the Department of Entomology at the British Museum (Natural History) and affectionately known to colleagues and friends as "Timothy" or "Tim" and sometimes as "Tiger", died on 10 November 1980 at the age of 89. He was born in Cambridge on 18 December 1891 and educated at Cambridge High School for Boys, a school which produced three other eminent naturalists formerly on the Museum staff: A. J. Wilmott, botanist, W. N. Edwards, palaeontologist, and F. W. Edwards, entomologist. He began his career in natural history as an assistant to Professor J. S. Gardiner in the Department of Zoology at the University of Cambridge and later, in the spring of 1913, moved to London and joined the library staff of the Linnean Society. In 1914 he went to Canada as curator of F. H. Woolley Dod's collection of Lepidoptera at Calgary, Alberta. In January 1916, after returning to England, he enlisted in the Canadian Army Medical Service and married in December of the same year. He served in the Canadian Army for three years as a radiographer and was demobilized in May 1919.

Timothy Tams joined the staff of the British Museum (Natural History) in February 1920 as an Assistant Keeper in the Department of Entomology. He succeeded Sir George Hampson as officer-in-charge of the Museum's collection of Heterocera and held this position until he retired in September 1957. Retirement seemed only to strengthen his devotion to entomology and to the unceasing taxonomic problems of colleagues and visitors, and he continued to attend the Museum regularly for another 20 years until the autumn of 1978, when increasing frailty made the journey from his home at Stoneleigh too hazardous.

When he joined the Museum in the 1920s, brass microscopes, gas lighting and coal fires were still in use, and he experienced the formality of the Edwardian era when a starched winged collar, bow tie and polished shoes were proper attire and convention was such that the Keeper of Entomology would refuse to acknowledge hatless male members of the staff when he met them in the street. A hint of Timothy's Edwardian background persisted and in later years he was admired for his varied and invariably becoming bow ties.

Tam's first entomological paper was published in 1917 and included illustrations of male genitalia of Lepidoptera, although it was not until the 1920s that the taxonomic usefulness of genitalic morphology was fully appreciated. He was thus progressive and always encouraged any initiative in research, but nonetheless remained an essentially conventional museum taxonomist. When equipment was scarce he would improvise, and it was probably his Army experience as a radiographer that enabled him to devise various pieces of photographic and drawing apparatus for entomological purposes, mostly from second-hand components.

In 1926 Tams travelled to Rennes with N. D. Riley to supervise the packing and transport of part of the vast and important Charles Oberthür collection of Lepidoptera, purchased by the British Museum (Natural History) and comprising over 750,000 specimens. Perhaps his scientifically most important collecting trip was with the Percy Sladen and Godman Trust Expedition to the islands in the Gulf of Guinea from October 1932 to March 1933. His narrative of the expedition appeared in the Museum's Natural History Magazine (Tams, 1934).

During the 1939-45 war Tams, in addition to his scientific work devoted largely to lepidopterous species of economic importance, which resulted in the important "Keys" publication in collaboration with A. S. Corbet (Tams & Corbet, 1943), undertook Air Raid Precaution duties involving first-aid work and fire-watching for incendiary bombs on the Kensington museum complex. As a fire-watcher he was sometimes stationed in one of the Museum towers while an air



W. H. T. TAMS

raid was in progress. Emergency escape from the tower was down the outside by rope, and *Tin Hat*, a war-time Museum magazine, shows in its June 1940 issue a photograph of "Tiger" making a practice escape from one of the north towers.

Tams became a member of the British Entomological & Natural History Society in 1922, when it was known as the "South London" and meetings were held in the rooms of the Royal Society at Burlington House, and in 1973 he was made a Special Life Member. In many ways he was a retiring personality, never seeking the limelight or high office, but always willing to share his knowledge with others, appearing on important occasions such as at the Society's Annual Exhibition. For many years he undertook the onerous task of photographing exhibited specimens of special interest for illustration in the Society's proceedings. On rare field trips he was an entertaining companion. In 1952 he went to Ireland with several members of the Society to follow up the remarkable discovery in the Burren, Co. Clare, of the noctuid *Calamia tridens* Hufnagel. In December 1957 he made the first of several visits to Madeira to collect insects and arachnids with E. W. Classey, W. S. Bristowe, A. E. Gardiner and R. W. J. Uffen, and together they contributed much valuable material to the Museum's collections. His last collecting expedition overseas was with Dr. I. W. B. Nye to the Seychelles Islands from January to March 1965.

Tams was an associate of the Linnean Society of London, and from 1953 until 1980 curator of its Zoological Collection at Burlington House, an office he considered a great privilege to hold. This perhaps reflected his interest in the Linnean binominal system and in the wrangles of zoological nomenclature. He believed firmly in the Law of Priority and in the use of original orthography of names. He had scant patience with those who sought the suppression of early names that might otherwise displace better known ones, and he would sometimes discourse on the activities of the Commission with "Tigerish" vigour. He was also an assistant editor of the *Entomologist's Gazette* from the time of its inception in 1951.

Tams was author of over one hundred publications on Lepidoptera, many dealing with the Lasiocampidae, a family in which he was especially interested. A full bibliography is appended. However, the full worth of his contributions to our knowledge of Lepidoptera cannot be assessed solely from his publications. His ever generous advice and help with identifications, and the countless photographs he took and processed, usually at home and at his own expense, contributed to an incalculable degree to most major taxonomic publications on Heterocera, both in the U.K. and overseas, for half a century. Ch. Boursin's studies of the Palaearctic Noctuidae, Trifinae, published between 1950 and 1968, and A. J. T. Janse's *Moths of South Africa*, volumes 1-3 dealing with Geometridae and part of the Noctuidae, published between 1932 and 1940, depended heavily on the assistance of Mr. Tams. Perhaps Dr E. C. Zimmerman's tribute in 1958, *Insects of Hawaii* 7: vii, speaks for all lepidopterists who knew Timothy Tams and who have been helped by him: "Mr. Tams' knowledge of facts and literature pertaining to the Lepidoptera is a well-known phenomenon, and the flow of information from him to me has for years been voluminous. His willingness to help others — at the sacrifice of his own studies — characterizes him as a person of extraordinary generosity, and I owe him much, as do many entomologists the world over".

D. S. FLETCHER & J. D. BRADLEY
British Museum (Natural History).

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CYRIL OSWALD HAMMOND

Cyril Hammond was born on 24th October, 1903 at King's Lynn where he spent his childhood with three sisters. He went to King Edward Grammar School in the town and developed an early interest in dragonflies, borrowing E. A. Atmore's copy of Lucas's colour illustrated book on British dragonflies. The surrounding countryside was, in those days, ideal for dragonflies, a rich fauna including such species as *Lestes dryas*.

Cyril entered college at St Mark and St John in Chelsea in 1922 for a teacher training course. His entire career was spent at Lordship Lane School, in north London, whence he retired as Deputy Headmaster in 1965. He lived, at first with a sister, at Wood Green nearby. He greatly valued being within easy reach of the British Museum (Natural History) where Miss Cynthia Longfield, the dragonfly authority, worked. In 1928 he became a fellow of the Royal Entomological Society.

Before the Second World War he visited many of the famous dragonfly sites including the Norfolk Broads and the Basingstoke Canal at Byfleet. Thus he saw them in their heyday when they really were swarming with dragonflies. Thursley Common was another favourite spot.

In 1937 Cynthia Longfield's *Dragonflies of the British Isles* was published. Cyril thought highly of this book and, with a second edition in 1949, it became the dominant reference on the subject for over 40 years. His main criticism, shared by many, was the poor quality of the colour illustrations, though when some additional colour paintings were placed in the second edition he contributed four plates in the original artistic style. In 1949 Miss Longfield published a review of the dragonflies of the London area (*London Naturalist* 28: 80-98) to which Cyril contributed his records – this work is of great historic importance in view of the changes which have occurred in the status of dragonflies during the intervening years. A few papers on his records also appeared in *The Entomologist*.

During the Second World War, whilst he remained at his teaching post, Cyril saw from the Royal Entomological Society membership list that C. N. Colyer lived close by. He made contact and Colyer replied to the effect that he was a dipterist but Cyril could come round if he wished. Cyril mentioned that he had a small box of flies and Colyer rather discouragingly said to bring them but they were bound to be common ones of no interest. How wrong Colyer was, for Cyril had a good eye in the field and knew there were some unusual species. Apparently Colyer was quite taken aback. Discussion led Colyer to mention that he was hoping to write a book on British flies but needed an artist. Cyril said he would be glad to do the illustrations and so a remarkable book was born.



CYRIL OSWALD HAMMOND

The concept of *Flies of the British Isles*, Warne, 1952, was ambitious and both men were amateurs. To review the entire British fauna must have been seen by their contemporaries as a daunting task. But the outcome is a masterpiece, the more so because the personal experiences of the authors are threaded through the myriad statements of fact and the style throughout is interesting. The illustrations drawn by Cyril are meticulous in their accuracy and detail. Each colour original is about 45 cm across and took around 17 hours to complete. The reproduction in the first edition is remarkably good but the originals are fantastic. All the colour work was done from fresh specimens, mostly from Scout Park which backed on to his garden. All the rare species came to hand as needed – he felt this could not have been achieved by chance. Practically every dipterist since publication has been stimulated by the book to pursue what would otherwise be a chaotic subject for the beginner. The first 5,000 copies sold out and a second edition was published in 1968 (some updating of the text and references was carried out by K. G. V. Smith and his colleagues at the British Museum; Colyer died in 1970).

In August 1962 I was on Bookham Common, Surrey and came across two gentlemen with nets by the Isle of Wight Pond. They asked me what I was collecting. I replied "Diptera". Astonished, one of them immediately asked if I recognised him from his picture in *British Flies* (taken nearly 20 years previously!). Somehow, I avoided a reply which was too tactless. They were Cyril Hammond and Andrew Low. I was invited to join them in looking for *Laphria marginata*. I could not remember exactly what it looked like in *British Flies*, but somehow I passed the initiative test of finding one when they could not. Thus began a friendship which was to develop over 18 years.

In the mid 1960s Cyril started to join me regularly on day trips. He would travel across London by public transport and welcome a lift down into various haunts in Surrey. Usually Peter Chandler would join in and Raymond Uffen sometimes linked up as well in these earlier days. Another favourite spot was Windsor Forest, a great treat since Cyril had a permit for the private areas where the best hoverflies were to be found.

Cyril was very good on field craft, but he had his own pace of working for his special species. He would leave the youngsters to dash around sweeping up the small species. He preferred to find a good spot, often a bank of flowers and then stand there with incredible patience or else hawk slowly up and down a chosen section of path. If *Calliprobola speciosa* had flown over a particular bush a few years previously, he would stand there for ages waiting for the next one. But he could also recognise a good spot afresh and would nearly always succeed in getting a notable record. Above all else he was a naturalist. Flowers, insects, it did not matter what it was providing he found it attractive. He had quite a collection of big attractive insects of various sorts and was keen on such groups as Orthoptera and had a small collection of tropical butterflies. Among the Diptera he would concentrate on the bigger hoverflies and larger Brachycera but had little affinity for the more obscure and difficult species.

In the early 1970s, with Longfield's book well outdated, Cyril felt a new book on dragonflies, with good colour illustrations was called for. I delayed this book by pointing out that it could possibly promote collecting at a time when many species were declining fast. At the same time I suggested a book on hoverflies but he felt his eyesight was not then up to the task. By the mid '70s he had made up his mind to pursue the dragonfly project. When Cyril approached the Biological Records Centre for use of the distribution maps, John Heath introduced him to Curwen Press with the idea of a book similar to the short version of *British Butterflies*. New plates then appeared for view at a steady rate and Cyril was out in the field seeing a remarkable proportion of the species each year so as to check out the correct colours in life. Unfortunately Eric Gardner died at a mid-way stage, thus negating the concept of a companion volume on larvae (Eric would

have substantially updated the keys given in his older publications). Curwen Press produced a neat book, though Cyril was disappointed not to have been given a freer hand in developing the type of book he really wanted. Despite very limited publicity, it is remarkable how well the book has sold.

Cyril's last publication, in June 1980, was as joint author of a booklet on the conservation of dragonflies published by the Nature Conservancy Council. Cyril had witnessed the phenomenal decline in dragonflies over the last half century and felt today's entomologists were very unfortunate. The deterioration of the Norfolk Broads seen by him during an NCC survey distressed him greatly. Over the last 12 years or so he had been closely involved in the monitoring and management of dragonflies on the Surrey Naturalists Trust reserve at Thursley Common, Surrey, now a National Nature Reserve.

Cyril was a delightful companion. He was in some respects quiet but had a lively mind and good sense of humour. A twinkle in his eye and slight expectant grin was a good cue that one had just failed to recognise a pun. To understand his character one had to see him with children – he quickly won their confidence and the slightest glimmer of intelligent interest in what he was doing would see him fascinating them in insects. He was also good with adults if they showed a sensible interest and of course entomologists wishing for advice got his immediate attention. Above all, he never seemed to expect much of life providing he could have his outings into the field. It did not matter if he found nothing unusual. He felt that the wonders of nature were ample proof of the existence of a Creator.

One of Cyril's biggest regrets was not to have joined the South London (now British) Entomological and Natural History Society until 1962. He became well known at indoor meetings for his talks and contributions to slide evenings. He was an excellent photographer and his speaking gave some clue of how popular he must have been as a teacher. He served on the Society's Council and as lanternist but poor health made him decline to stand as President. His Will specifies that the majority of his estate is to be split equally between the three national entomological societies – his library and cabinets come to the Society although unfortunately part of his collection deteriorated during a spell in hospital a few years ago.

The respect with which he was held by a wide spectrum of entomologists, both professional and amateur, is aptly reflected in his holding honorary membership in all three national entomological societies. This rare and possibly unique distinction came in the period 1979 and 1980 and gave him immense pleasure. The citation for honorary fellowship to the Royal Entomological Society (1979, *Antenna* 3: 110) gave a chance to express a thank you to him for what he had done, summing up his service to entomology as being "in the highest traditions of the British amateur entomologist".

Cyril was active in the field to within a few weeks of his death. On 14th June 1980 he attended the first Dragonfly Recording Scheme field meeting when 45 people came to Thursley Common. On 16th-21st June he joined the long field meeting of our Society at Rogate, Sussex, when he climbed over five-barred gates and walked several miles on some days. He had a mild stroke while visiting his elderly sister, his sole surviving relative, in Norfolk. During a short spell in hospital he suddenly died. On 23rd August, 1980 we lost a fine entomologist, but one who lived life to the full.

ALAN E. STUBBS

WILLIAM LEONARD COLERIDGE 1892-1980

Leo Coleridge, as he preferred to be called, was 6 ft 3 in tall, well-spoken and with a military bearing. He had enjoyed fishing and shooting in his earlier days and was a good sportsman, first at tennis and squash, later golf and bridge. He believed that foreigners would understand you if you spoke loud enough. He was convinced that his own ideas were right and seemed brusque to many, but I found him to be kind and considerate to those whom he knew and always ready to help those who showed an interest in his many pastimes.

During the 1914-18 war Leo served first as a despatch rider in France, one of the early motor-cyclists, then as a pilot in the Royal Flying Corps. After the war, he continued to hold a pilot's licence and loved to drive fast cars. He was an excellent driver, but had his accidents, the last at the age of 86.

In business Leo had been successful in many spheres: corn and seed merchant, gravel extraction and managing director of a group of pet shops. He retired more than once, only to be called back in some new capacity.

Leo first introduced himself to me some 30 years ago via the Wants & Exchange List of the Amateur Entomologists' Society. We corresponded and exchanged, as his mercury vapour lamp at Bishopsteignton caught many migrants. I first met him at our Annual Exhibition in 1955, soon after he had suffered and made an amazing recovery from a severe heart attack. At that meeting he introduced me to his other interest, European butterflies, and we arranged a trip abroad for the following summer. From then onwards we made a trip almost every year, with my father, the late Joseph Cribb, who collected beetles, and, after his death in 1967, together with another member. France, Italy, Switzerland, Yugoslavia, Greece and Spain were all visited, some several times. In 1975 he celebrated his 83rd birthday in the Julian Alps. On our visit together that year to Plitvice in Croatia and Kranjaka Gora in Slovenia Leo suffered another heart attack and was advised not to travel abroad again. He continued to take a great interest in entomology, regularly visiting the London exhibitions of the Society and the A.E.S.

At the age of 80 Leo built himself a new home next to "The Gnull" and furnished the garden with a series of ponds to house his other interest, amphibians, with a large greenhouse for his lizards and snakes. On our trips abroad he had brought home fire-bellied toads, midwife toads, snakes and lizards and these lived along with a colony of *Rana ridibunda* and native species. He was a member of the Herpetologists' Society and of the Devon Trust and had a keen interest in birds and mammals. After his wife Sybil's death in 1978, Leo moved into a hotel in Torquay, keeping his two cabinets of European butterflies with him, but giving away his books to friends and disposing of his British collection through the A.E.S. Just prior to his death he arranged for his European collection to go to the B.E.N.H.S.

Leo Coleridge died peacefully on 24th May at Torquay.

P. W. CRIBB

FIELD MEETINGS

SANDY DOWN, BOLDRE, HAMPSHIRE

29th & 30th March 1980 and 28th and 29th March 1981

Leaders — Mr. & Mrs. R. W. Watson

43 members attended this regular gathering in 1980. Although this meeting, held at the home of Mr. & Mrs. R. W. Watson, was omitted from the Society's yearly programme card in 1981, some 28 members and friends attended over the two days.

In excellent weather members were able to inspect the special equipment designed to overwinter larvae in large numbers with a maximum success rate.

Opportunities were provided for members to inspect over 550 drawers of the Watson Collection which now forms part of the National Collection housed at Boldre and the many rarities and aberrations it comprises.

Further examples of aberrational forms of *Tyria jacobaeae* (L.) delighted the visitors who have come to regard such as the central feature of the collection.

Members are grateful for the unstinted hospitality of their hosts and the pleasant atmosphere which allowed old friendships to be renewed and new ones created.

VIRGINIA WATER – 17th/18th May 1980

Leader – Mr. P. J. Baker

Fourteen members of the Surrey Trust for Nature Conservation joined four members of the BENHS for the first formal field meeting at the Riverside Walk area of Virginia Water on a beautifully sunny day.

The well recorded flora of the area, which was at its best, was admired at the same time as the fauna was sought. Searching continued at night, but a sharp temperature drop gave poor records at light.

Birds were much in evidence and included:– blackcap, wren, willow warbler, chiff-chaff and the green woodpecker. A frog was seen, which was a nice record for a part of Surrey where this animal has become very scarce in recent years.

All the local butterflies were seen – *Polygonia c-album* (L.), (ovipositing on the common hop), *Gonepteryx rhamni* (L.), *Lycaena phlaeas* (L.), *Celastrina argiolus* (L.), *Parage aegeria* (L.), *Pieris brassicae* (L.), *P. napi* (L.) and *Anthocharis cardamines* (L.). Other macrolepidoptera seen in flight or disturbed included:– *Aethalura punctulata* (D. & S.), *Xanthorhoe montanata* (D. & S.), *X. designata* (Hufn.), *X. ferrugata* (Clerck), *Petrophora chlorosata* (Scop.), *Macrothylacia rubi* (L.), *Anarta myrtilis* (L.), *Cabera exanthemata* (Scop.) and *Colostygia pectinataria* (Knoch). Additional macros seen at light included:– *Trichopteryx carpinata* (Bork.), *Lomaspilis marginata* (L.), *Pterostoma palpina* (Clerck), *Agrotis puta* (Hübner), *Colocasia coryli* (L.) and *Opisthograptis luteolata* (L.).

Sawflies noted were:– *Arge gracilicornis* (Klug), *Ametastegia equiseti* (Fallen), *Blennocampa pusilla* (Klug), *Selandria serva* (Fab.) and *Cephus nigrinus* (Thom.).

Flies included the syrphid *Leucozona lucorum* (L.), *Phytomyza ilicis* (Curtis) – mining holly leaves – and a pest in the area, the large narcissus bulb fly *Merodon equestris* (Fab.).

The leader's thanks go to the recorder of the "other orders" and it is hoped that future meetings will see more members helping with this important task.

WINCHCOMBE DOWNS (WYE NNR), KENT

31st May & 26th July, 1980

Leader – M. A. Enfield

These meetings were held to produce records of Lepidoptera for this new extension to Wye National Nature Reserve. It was known to be one of the few sites in East Kent for *Hamearis lucina* and *Lysandra coridon*, but little was known about the moths occurring there, and we hoped we might find *Pachetra sagittigera*. We did not find *sagittigera*, but, despite the rather poor weather, we did record 205 species at the two meetings of which 83 were new records for Winchcombe, and six not previously recorded for the Ashford area.

Among the more interesting chalk grassland species found were *Teleiodes sequax* (*Helianthemum*), *Thisanotia chrysonuchella* (*Festuca ovina*) and *Oncocera semirubella* (Leguminosae). We also found some species not usually associated with the chalk, for example:— *Eupithecia tantillaria* (*Pincea*), which had probably wandered from the woods to the north; *Hepialus fusconebulosus* (*Pteridium*), whose foodplant occurs only in one or two very small areas on the reserve; *Parastichtis suspecta*, a woodland species which seems to be becoming more widespread.

Thanks are due to John Duffield, the warden, for allowing us to run mv lights on the reserve.

The full list of records will be held in the Society's library.

PAMBER FOREST, HANTS – 7th June 1980

Leader – B. Skinner

Eighteen members and friends attended this night meeting. Permission had been granted to take vehicles into the forest and so the party quickly dispersed in all directions in search of suitable looking trapping sites. The weather started off cool and dry, then later, because of the cloudless sky, became unpleasantly cold. Despite these unfavourable conditions and because of the impressive array of UV lights a respectable total of 84 species of macrolepidoptera were recorded. The more interesting of these were *Tethea* or (*D. & S.*), *Idaea trigeminata* (*Haw.*), *Euphyia unangulata* (*Haw.*), *Eupithecia plumbeolata* (*Haw.*), *Minoa murinata* (*Scop.*), *Cepphis advenaria* (*Hüb.*), *Hyloicus pinastri* (*L.*), *Mimas tiliae* (*L.*), *Ptilodontella cucullina* (*D. & S.*), *Nola confusalis* (*H-S.*), *Acronicta alni* (*L.*), *Autographa gamma* (*L.*), and *Herminia strigilata* (*L.*). Only seven species of microlepidoptera were noted, these were *Elachista albifrontella* (*Hüb.*), *Ancyliis achatana* (*D. & S.*), *A. geminana* (*Don.*), *Ptycholoma lecheana* (*L.*), *Cochylis atricapitana* (*Steph.*), *Capua vulgana* (*Frölich*), and *Nemophora degeerella* (*L.*).

Several members had spent the earlier part of the day in the Forest and one of them, Mr. A. J. Halstead, recorded the following Sawflies:— *Arge cyanocrocea* (*Forst.*), *Dolerus niger* (*L.*), *Tenthredo livida* *L.*, *T. mesomelas* *L.*, *T. ferruginea* *Schrank.*, and *T. maculata* *Geof. in Fourc.*

SWANAGE – 5th/6th July 1980

Leader – P. J. Baker

Three BENHS members and two young guests attended this meeting which, slotted in as it was between depressions, gave a sunny though breezy day followed by a fairly calm overcast night.

An early afternoon stroll showed that the bee orchid was again present in its usual locality – though fewer flowering spikes were noted than for last year. Several young slowworms were also found sheltering under a section of discarded guttering near the administration buildings. The list of larger life forms was completed at dusk when one of the younger members saw a badger.

The main feature of the night was the vast number of moths present at sugar. One small patch produced 63 insects, all but one of which were *Noctua pronuba* (*L.*) with the odd one being *Mormo maura* (*L.*), to me a new record for the area. In total 85 species of macros were recorded, those being worthy of note including: *Sterrhia trigeminata* (*Haw.*), *Asthena albulata* (*Hufn.*), *Sphinx ligustri* (*L.*), *Agrotis trux* (*Hüb.*), *Plemyria rubiginata* (*D. & S.*), *Catarhoe rubidata* (*D. & S.*), *Epirrhoe rivata* (*Hüb.*).

A specimen of *Aglais urticae* (*L.*) came to one of the lights.

KING'S FOREST, WEST STOW, SUFFOLK July 1979 & August 1980

Leader — B. C. Jackson

Six members attended each meeting. In 1979 140 species were recorded but only 60 in 1980 despite the working of 6 mercury vapour lights.

Among the species noted were:— *Pseudoterpn pruinata* (Hufn.), *Geometra papilionaria* (L.), *Cyclophora porata* (L.), *C. punctaria* (L.), *C. linearia* (Hüb.), *Scopula rubiginata* (Hufn.), *Idaea emarginata* (L.), *I. straminata* (Borkh.), *Catarhoe cuculata* (Hufn.), *Epirrhoe rivata* (Hüb.), *Pelurga comitata* (L.), *Cosmorhoe ocellata* (L.), *Eulithis pyraliata* (D. & S.), *Cidaria fulvata* (F.), *Colostygia multi-strigaria* (Haw.), *Hydriomena furcata* (Thunb.), *Philereme transversata* (Hufn.), *Euphyia unangulata* (Haw.), *Eupithecia linariata* (D. & S.), *E. centaureata* (D. & S.), *E. absinthiata* (Cl.), *E. icterata* (Vill.) ssp. *subfulvata* (Haw.), *E. succenturiata* (L.), *E. pusillata* (D. & S.), *Selenia tetralunaria* (Hufn.), *Hylaea fasciaria* (L.), *Hyloicus pinastri* (L.), *Deilephila porcellus* (L.), *Noctua fimbriata* (Schreb.), *Parastichtis suspecta* (Hüb.), *Apamea scolopacina* (Esp.), *Photodes fluxa* (Hüb.), *Pseudoips fagana* (F.), *Laspeyria flexula* (D. & S.).

Also noted were larvae of *Stauropus fagi* (L.) on beech.

BRAMPTON BRYAN — 12th/13th July 1980

Leader — J. Cooter

Preliminary visits to Brampton Bryan — an area of great diversity dominantly mature/overmature closed canopy woodland and open parkland with some plantations and upland heath (at just over 1000 ft) — produced several interesting insects. Among the Coleoptera *Leistus rufomarginatus* (Duft.) new to Herefordshire., *Platydacus fulvipes* (Scop.), *Epuraea angustula* Sturm. Lepidoptera included larvae of *Quercusia quercus* (L.), single migrant *Vanessa atalanta* (L.) and *Cynthia cardui* (L.), and among the indigenous species *Hepialis fuscobulosa* (De Geer), *Nemophora degeerella* (L.) abundant especially in shaded areas of Pedwardine Wood, *Boloria selene selene* (D. & S.) flying June to July in the boggy region around Laogh Lady Well, and *Epirrhoe tristata* (L.) in Pedwardine Wood.

A party of six assembled for the field meeting proper and spent the morning in the unmanaged north-western part of the Park progressing as far as the lake, around the margins of which were vast numbers of toadlets. In places they were often four or five deep over areas of up to one square foot, one could not move without treading on several.

The afternoon was spent in the ancient oak coppice of Pedwardine Wood and the upland heath remnant, but the strong wind in this exposed place was not conducive to profitable collecting. Towards the evening two Heath traps and one Robinson trap were set up and the party dispersed — those intending trapping went off for a meal, the others back home to work on the catch.

From a long list of captures the following deserve mention:— *Argynnis aglaja aglaja* (L.), *Aphantopus hyperantus* (L.), *Hepialis hecta* (L.), *Deilephila porcellus* (L.) (uncommon in the County, but known from places on the Malvern Hills), *Diarsia brunnea* (D. & S.), not uncommon at light, *Xestia ditrapezium* (D. & S.), *Anaplectoides prasina* (D. & S.), a forewing in a cobweb noted by Dr. Harper, *Panolis flammea* (D. & S.), larva on pine, *Autographa pulchrina* (Haworth) and *A. jota* (L.), *Argyresthia* species including *retinella* Zeller, *brockeella* (Hübner) and *goedartella* (L.) from birch, *pygmaella* (Hübner) from *Salix*, *sorbiella* (Treitschke) and *conjugella* Zeller from rowan, plus *glaucinella* Zeller from one of the ancient parkland oaks (the only previous county records for this species are from Haugh Wood), *Tubuliferola josephinae* (Toll), possibly new to Herefordshire and *Pandemis cinnamomeana* (Treits.).

Coleoptera included several *Cychrus caraboides rostratus* (L.) in a limited area — previous experience of this species has shown it to occur singly, numerous small-fry from grass traps (not yet determined) (*Acrotrichis*, staphs. and Scydmaenids), *Asemum striatum* (L.) and *Tetropium gabrieli* Weise on cut pine logs in Pedwardine Wood and *Judolia cerambyciformis* (Schrank) on umbellifers in the Park.

Our thanks are due to Mr. C. C. Harley for permission to collect on the Estate and to Mr. M. Oliver for help with the Robinson trap and general advice as to "best areas".

MAIDENHEAD THICKET, BERKSHIRE — 19th/20th July 1980

Leader — T. J. G. Homer

Very wet weather on 18th July and continued until lunch time on 19th suggested that the proposed excursion would take place in the leader's entomology room, but the welcome arrival of four members and two friends coincided with the rain easing and all proceeded to the vicinity of "Robin Hood's Bower" to the north of the Maidenhead to Henley Road where the Thicket had been improved by the opening of new glades which promises well for the future. The area should be rich in entomological material but conditions prevented anything of note being recorded.

However, the party moved to a good clearing in an isolated section of the Bisham Woods overlooking Temple Golf Links where the soil is typical chalk down and a strong colony of *Melanargia galathea* (L.) was quickly disturbed and *Zygaena trifolii* (Esp.) was sitting about commonly. A young larva of *Smerinthus ocellata* (L.) and the empty ova of *Cerura vinula* (L.) were found and a larva of the latter in its last instar pleased the younger members of the party.

After spending some time having tea and going through the leader's lepidoptera collection the party returned to "Robin Hood's Bower" where two more members from Reading joined them and with the temperature well up in the 50s F. despite damp conditions, five lights produced 42 species of macro-lepidoptera plus an as yet unspiciated haul of micro-lepidoptera before being rained off at about midnight.

Of interest among the macro-lepidoptera were:— *Hepialus humuli* (L.), *H. hecta* (L.), *Cyclophora punctaria* (L.), *Idaea trigeminata* (Haw.), *Xanthorhoe quadrifasciata* (Cl.), *Cidaria fulvata* (Forst.), *Melanthia procollata* (D. & S.), *Philereme vetulata* (D. & S.), *P. transversata* (Hufn.) ssp. *britannica* Lempke, *Perizoma flavofasciata* (Thunb.), *Eupithecia haworthiata* (Doubl.), *Hydrelia flammeolaria* (Hufn.), *Mimas tiliae* (L.), *Nola cucullatella* (L.), *Graphiphora augur* (Fabr.), *Lythacodia pygarga* (Hufn.), *Autographa jota* (L.), *Laspeyria flexula* (D. & S.) and *Hypena proboscidalis* (L.).

STOCKBRIDGE DOWN AND HAREWOOD FOREST, HANTS

2nd August 1980

Leader — Brig. E. C. L. Simson

Six people met the leader at the foot of the downs at 14.30 hrs on a warm, sunny day. Sixteen species of butterflies were seen. *L. coridon* (Poda) was in above average plenty and *A. aglaia* (L.) females were observed ovipositing. The second generation of *C. minimus* (Fues.) was more plentiful than for some years. Despite a very wet summer it was obvious that some butterflies had not suffered.

Juniper bushes were beaten for larvae of *Thera juniperata* (L.). Many were obtained, but from previous experience few will not be parasitised. In the process,

numbers of the pug *E. pusillata* (D. & S.) were flushed and several *Argyresthia abdominalis* Zeller were taken. The hoped-for second generation of *Mesotype virgata* (Hufn.) was not seen, though the date was correct. Other insects seen on the down were: *Ypsolopha scabrella* (L.), *Dichomeris marginella* (F.), *Ancylis unculana* (Haw.), *Pyrausta purpuralis* (L.), *Phytometra viridaria* (Clerck), *Eremobia ochroleuca* (D. & S.), the hoverfly *Chrysotoxum bicinctum* (L.) and the sawflies *Abia sericea* (L.), *Tenthredo acerrima* Benson, *T. schaefferi* Klug and *Pachyprotasis rapae* (L.).

At 18.00 hrs we assembled at the White Lion, Wherwell for refreshments. There we met five more people who had come for the purpose of sugaring and working mercury vapour lamps in Harewood Forest. Through the kindness of Lady Brecknock, we were permitted to place nine lights, with associated sugaring areas. Only six of these sites were occupied, people preferring to work in pairs. The lights were placed over a distance of 1½ miles. The Forest was well covered.

The hoped-for sighting of *Catocala promissa* (D. & S.) did not happen, but, on a fine, warm night *Chlorissa viridata* (L.) was recorded, not having been previously confirmed in the vice-county. *Ptilodontella cucullina* (D. & S.) gave confirmation of the first record of this species in Harewood Forest in 1979. Of the many other species that came to light or sugar the following are selected for mention.

Monopis ferruginella (Hübner), *Caloptilia robustella* Jäckh, *Paltodora cytisella* (Curtis), *Rhynchopacha mouffetella* (L.), *Zeiraphera diniana* (Guenée), *Eurrhynx lancealis* (D. & S.), *Endothenia ericetana* (Humph. & West.), *Hedya ochroleucana* (Fröhl.), *Ptycholomoides aeriferanus* (H.-S.), *Scoparia subfusca* (Haw.), *S. basistrigalis* Knaggs, *Thera variata* (D. & S.), *Euchoeca nebulata* (Scop.), *Ennomos quercinaria* (Hufn.), *Deileptenia ribeata* (Clerck), *Harpyia furcula* (Clerck), *Meganola strigula* (D. & S.), *Euxoa tritici* (L.), *Parastichtis suspecta* (Hübner), *Acronicta leporina* (L.), *Craniophora ligustri* (D. & S.), *Photodes minima* (Haw.), *Rivula sericealis* (Scop.).

SOUTH BENFLEET, ESSEX – 4th October 1980

Leader – A. M. Emmet

The weather was sunny and warm and nearly 30 persons, including families and visitors, were present. In the morning the party concentrated on the black thorn bushes, where cases of *Coleophora prunifoliae* Doets, *C. adjectella* H.-S., *C. violacea* (L.) and *C. anatipennella* (Hübner) were all plentiful. *Stigmella plagicolella* (Stainton), *Phyllonorycter pomonella* (Zeller) and *Prunus*-feeding *Parornix* were also common, as were vacated mines of *Ectoedemia spinosella* (Joannis).

After lunch, when a photograph was taken, the party split up. Some went to the salt-marshes on Canvey Island, mainly to search for *Coleophora*. The most notable find was a single case of *C. linosyridella* Fuchs, the pre-hibernation case of which had not previously been observed in Britain. Others continued to search on various foodplants on the downs. Small cases of *C. conspiciuella* Zeller were locally common on *Centaurea nigra* and it was possible to observe the gallery mines, some with the chorion still *in situ*, in which this species starts its feeding. An attempt to compare the early feeding of *C. prunifoliae* with that of *C. cerasivorella* Packard, which is plentiful on *Crataegus* at Benfleet, was successful in a negative sense. The mines from which the latter's cases had been excised were in evidence, as well as its scanty early feeding; the cases, however, had already gone. This confirms observations made elsewhere that *C. cerasivorella* feeds less extensively in the autumn and goes into hibernation earlier; moreover, unlike *C. prunifoliae*, it makes no extension to its case until it starts to feed again in the spring.

In all, 17 species of *Coleophora* were recognised and 3 or 4 others, still unidentified, were found on the salt-marsh. From other families, *Tischeria angusticollis* (Dup.) was in evidence on rose, though still rather small, and *Ectoedemia erythrogenella* (Joannis) was already feeding on bramble. Few adults were on the wing, but several late butterflies were seen; a visitor from the staff of Southend Museum said that a clouded yellow (*Colias croceus* (Geof.)) had been observed in the area. The President and his son beat a few *Acleris cristana* (D. & S.) from the blackthorns.

An enjoyable climax to a successful meeting was provided by the Rev. and Mrs D. J. L. Agassiz, who entertained many of the party to tea at their new vicarage at Grays, a kindness appreciated all the more since they had only moved in earlier in the same week.

INDOOR MEETINGS

The Indoor Meetings Programme is a major part of the Society's activities and with the completion of the 1981/82 programme it seemed a suitable moment to draw attention to some new ventures and to request assistance in the preparation of future programmes.

Three new ventures have been added to the Indoor Programme in the last three years. The first of these, the joint meeting with the Royal Entomological Society, should now be familiar to all members and has become a regular fixture. This year (1981) it will be our turn to be hosts and details of the meeting appear on the programme card. In 1979 your Council decided that there should be an annual lecture on a subject fundamental to the study of entomology. This lecture is intended to provide members with an up to date account of subjects otherwise available only from specialist textbooks. The first of these Review Lectures was given by J. P. Edwards as part of the 1980/81 programme, his subject was "The role of hormones in the development and reproduction of insects". The second lecture will be given by Professor R. J. Berry during the 1981/82 programme and his subject will be "The genetic basis of variation". The Council also felt that encouragement should be given to younger members of the Society to address the Society. At the same time it was recognised that giving a full length talk can be a daunting experience and it was decided to set aside one meeting to be shared by two members. There is no formal definition of "younger members" but 25 might be a suitable age limit. At the time of writing the first of these meetings has yet to take place, but I hope it will be a success. Future meetings of this kind will depend on the response from our younger members and I would be pleased to hear from volunteers for the 1982/83 programme.

The Indoor Meetings Programme should reflect the interests of all the members; inevitably, however, it tends to reflect the interests and range of contacts of the Meetings Secretary. May I, therefore, ask for your comments on the programme and for suggestions of subjects about which you would like to hear more. I would also be pleased to receive suggestions of persons I could approach as potential speakers. And if you would like to give a talk yourself I would, of course, be delighted to hear from you. Preparations for the 1982/83 programme will begin in September 1981.

John Muggleton
Assistant Secretary: Indoor Meetings

12th June 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

The President announced the death of W. L. Coleridge, for many years a member, who also left his collection of Lepidoptera to the Society.

EXHIBITS

Col. A. M. EMMET — Maps shewing the distribution of *Coleophora conspicuella* Zeller and *Cosmopterix zieglereella* (Hübner) in Essex, with specimens of each, reared from larvae taken in Essex. Both are regarded as rare species, but the former is widespread and locally abundant in south-east Essex and the latter is common in eastern Essex and also occurs more sparingly in the western half of the county.

Dr. I. McCLENAGHAN — An example of *Heliothis assulta* (Lep. Noctuidae), bred in April from a yellow and green larva found amongst imported green chillies from Kenya by the Rev. R. Broad of Chelmsford, Essex; also a winged queen ant *Ponera coarctata* (Latr.) (Hym., Formicidae), found in the exhibitor's garden near Brentwood, Essex on 13.viii.79. This is the first record of this tiny, rare ant, known mainly from around the Thames estuary Kent, and the South Coast. Also a worker ant *Myrmica schencki* Emery (Hym., Formicidae) found in Grays chalk quarry, S. Essex on 6.vi.76. This is the first Essex record of this rare ant which has been recorded from less than twenty 10-km squares in Britain.

A. STUBBS — Booklets recently received from the Nature Conservancy Council and produced jointly with specialists: *The Conservation of Dragonflies* (our member C. O. Hammond is among the authors), and *The Conservation of Snails, Slugs and Freshwater Mussels*.

R. UFFEN — (a) Larvae of *Coleophora vibicigerella* Z. (Lep. Coleophoridae) on *Artemisia maritima* from a N. Kent salt marsh where young plants abound on the edges of islands of *Agropyron* grass rising above the general level of the marsh. Scattered cases, probably of *C. machinella* Bradley, occur in the same locality. Both larvae were last seen in saltmarshes by Essex collectors at the end of the last century.

(b) An undetermined coleophorid case taken with the above species; larger than those of our *Atriplex*-seed-feeders, with three yellowish gussets let into the whole length of the brownish-ochreous case.

(c) A larva of *Coleophora linosyridella* Fuchs from the drift-line on a Canvey Island salt marsh. The leaf of *Aster tripolium* shows how the long narrow blotches with central entrance hole quickly turn brown and become inconspicuous. New to Essex. The species was first found in Kent by Mr. N. F. Heal.

(d) Larvae of *C. trochilella* (Dup.) and *C. troglodytella* (Dup.) for comparison with (c).

(e) Two larvae, later shown to be *C. peribenanderi* Toll, found on *Cirsium arvense* at Benfleet, Essex.

(f) A *Senecio* collected from 8000 ft in Colombia. The calyx segments, fringed by glandular hairs, fan out like spiders' legs behind the flowers. The example was alive and had been grown from a cutting.

COMMUNICATIONS

Messrs. G. PRIOR, M. CHALMERS-HUNT, T. G. HOWARTH, E. WILD and K. EVANS successively reported observations on or captures of immigrants in a recent wave. A huge migration of *Cynthia cardui* (L.), the painted lady, had occurred in the British Isles, reaching as far north as N. Aberdeen. Less extensively and in smaller numbers, *Trichoplusia ni* (Hübner) *Autographa gamma* (L.),

Plutella xylostella (L.), *Vanessa atalanta* (L.) were also reported as accompanying the influx. G. PRIOR also mentioned the abundance of *Callophrys rubi* (L.) and reasonable numbers of small colonies of *Eurodryas aurinia* (Rott.) and *Boloria euphrosyne* (L.) near Ilfracombe.

M. CHALMERS-HUNT also reported that he had that morning seen a good flight of *Mellicta athalia* (Rott.) at Blean woods, Kent.

Dr. C. RAINEY then gave an illustrated talk on insect migration: further recent findings.

Subsequent questions showed the interest this had evoked in the audience, and in one of his answers Dr. RAINEY stated that in some migrant species, particularly the desert locust (*Schistocerca gregaria* Forsk.) (Orth. Acrididae) no static populations had been found to exist and the solitary phase only occurred intermittently among stragglers and drop-outs of the constantly swarming populations.

A verbal report on a recent meeting at Pamber forest was then made by one of those attending. Despite twenty lights the poor total of 81 species of lepidoptera had been observed, as the night had been rather cold.

26th June 1980

The President, Mr. R. FAIRCLOUGH, in the Chair.

EXHIBITS

Dr. A. A. ALLEN — (i) Some specimens of *Apanteles pallipes*, Reinhard, bred 26.v.1980, from a larva of *Autographa* sp. (probably *pulchrina* (Haw.)) (Noctuidae) swept 3.v.1980 from nettle, Arundel, Sussex. The host was about 2/3 full-grown when found; it fed well on nettle but on 14.v.80 a large number of parasitic larvae appeared from the host and spun the tight mass of white cocoons, characteristic of *pallipes* from Plusiinae. Thirty-five adults were bred (not all the cocoons hatched) and a point of note was that all were female.

(ii) A male *Banchus volutatorius* L. (Hym., Ichneumonidae), bred 28.iv.1980 ex larva of *Anarta myrtilli* (L.) (Lep., Noctuidae), swept from heather, 26.viii.1979, Brownsea Island, Dorset; the parasite larva appeared from the host pre-pupa, 30.viii.79, and proceeded to spin the elongate, black papery cocoon, characteristic of the genus. Other larvae collected were also thus affected. The exhibitor had obtained *Banchus* sp. (which are not commonly encountered) from *myrtilli* on previous occasions from Devon, but the parasite pre-pupa had often died in its cocoon over the winter months.

(iii) A specimen of *Mompha locupletella* (D. & S.) (Mompidae), captured 30.v.1980, in sunshine, Brownsea Island, Dorset.

Mr. R. F. BRETHERTON Photographs (taken by Mr. Peter Smith of Doverscout, N. Essex) of *Chrysodeixis chalcites* (Esper), *Mythimna unipuncta*, (Haw.) and *Gortyna borelii lunato*, Freyer, (all Noctuidae), all taken in 1979. The *chalcites* was the fourth record of the specimen in England in 1979 while the *unipuncta* was possibly the first record for the moth in the North Essex vice-county.

Mr. R. FAIRCLOUGH — a lively specimen of *Rhyacia simulans* (Hufn.) (Noctuidae) taken on an unpromising night at Portland, Dorset, 23.vi.1980. Only twenty species of moth were recorded (amongst which was *Mythimna l-album* L.). Seventeen specimens of *simulans* were taken outside the trap (none were present inside) on flowers of Red Valerian (*Centranthus ruber* (L.)).

MEMBERSHIP

Their names having been read for the second time, the following were declared members: — Messrs. T. W. V. Green, T. B. Scott, E. D. Ponting and P. Convey.

ANNOUNCEMENTS

On behalf of P. Sokoloff it was announced that the rearrangement of the photographic slide collection of the Society had been completed; each slide bore the stamp of the Society and members were welcome to borrow the slides.

I. McLean gave notice that part of Abernethy Forest (about the last relic of the Caledonian pine forest of Scotland) had been sold and was now threatened with modification particularly of the wet hollows and open dry areas, by planting other conifer species. He appealed to members to send records of entomological denizens of note to the Nature Conservancy Council in an attempt to support the conservation case.

COMMUNICATIONS

Mr. K. EVANS suggested that as undoubtedly high numbers of *Clostera anachoreta* (D. & S.) had been bred since its rediscovery, possible criticism by conservationists might be forestalled if numbers were released at the Dungeness site.

Dr. A. A. ALLEN then showed some slides, mostly of parasitic Hymenoptera or Lepidoptera encountered in the spring of 1980, including *Ladoga camilla* (L.), *Orthosia populeti* (F.) and *Luffia ferchaultella* Stephens and the species mentioned as hymenopterous exhibits.

10th July 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

EXHIBITS

Dr. A. A. ALLEN — A short series of *Microplitis ocellatae* (Bouché) (Hym., Braconidae) bred from a larva of *Smerinthus ocellata* (L.). The host was found in August 1979 at Dungeness, Kent, by Mr. Julian Clarke a medical student. The nine parasites spun singly their dull brownish-grey, virtually unribbed cocoons; the captor then kindly passed them to the exhibitor. The adults were bred at irregular intervals from late May to early June 1980.

P. SOKOLOFF — (i) Several dozen live clothes-moths (*Tineola bisselliella* (Hummel) bred from larvae previously exhibited feeding on wool and (ii) a box containing 87 moths bred from a sample of 22 yarrow roots dug earlier this year from Bexley in Kent, all of the genus *Dichrorampha*, comprising 10 *D. plumbana* (Scop.), 8 *D. sequana* (Hüb.), 30 *D. petiverella* (L.) and 39 *D. gueneana* Obraztsov.

E. P. WILTSHIRE — Ova of *Mythimna l-album* (L.) (Lep., Noctuidae) laid by a female found with others at the foot of cliffs in the Isle of Wight in late June; these were just hatching, after being laid in captivity rather indiscriminately on grass heads and stems; ova of *Aplocera efformata* (Guenée) (Geometridae) being a third generation of this moth which was plentiful among *Hypericum perforatum* growing in a derelict rail-yard at Cookham station, East Berks., bred in captivity, those that had laid these ova were "out of phase" with the wild generations, of which the second brood had not yet appeared this year in the wild but was expected to fly in late July-August.

COMMUNICATIONS

E. H. WILD reported that two male *Clostera anachoreta* (D. & S.) had appeared in his trap in Surrey; the species appeared to be spreading after its recent landing at Dungeness or had escaped from captivity.

Col. A. M. EMMET reported that *Coleophora conspicuella* Z. having multiplied on its habitat as previously reported had now killed off all except one immune plant of *Centaurea nigra* and could be expected to die off after thriving too greatly.

S. MEREDITH reported having seen thousands of *Mellicta athalia* (Rott.) flying in Blean woods, Kent last month following extensive coppicing there a year or two before and also having been nipped by a click beetle (probably *Dalopius marginatus* (L.)) in North Wales while sitting on a grassy bank; it clung tenaciously by its mandibles to his anatomy.

P. L. COOK reported having seen thousands of cockchafers (*Hoplia philanthus* (Fuessly)) in Richmond Park on hawthorn foliage and flying around and on the ground showing how abundant it was and how in suitable conditions this became evident.

C. B. ASHBY spoke on "Species survival and success". Striking or beautiful slides were shown of ducks, habitats and of moths on different backgrounds on which, in some experiments, the moths had taken up positions harmonising with colour patterns of fabrics after repeated releases. His conclusion was that the hide-and-seek game was universal in life forms.

24th July 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

EXHIBITS

Col. A. M. EMMET — A larval case attributed to *Coleophora leucapennella* (Hübner) (Lep., Coleophoridae) found on a tree trunk in a wood in N.E. Essex on 19th July 1980. *Silene dioica* was growing plentifully nearby. According to Uffen in *The Field Guide to the Smaller British Lepidoptera*, the larva leaves the foot-plant to over-winter, and this may explain its presence on a tree-trunk. The species was first recorded in Britain in Norfolk, and has since been found in a wood in Gloucestershire. There appear to be no other British records.

P. L. COOK — An adult and mines of *Agrilus pannonicus* (Pill. & M.) (Col., Buprestidae) reared from a pupa, found under oak-bark on 30.v.80 and hatching in vi. It was first discovered at Windsor Great Park by Dr. Allen three years ago and appears to be well established there.

MEMBERSHIP

Messrs. Y. Z. Erzincioglu, P. F. C. Sales, and F. C. Carpenter were elected.

COMMUNICATIONS

Col. A. M. EMMET reported having taken in great numbers *Catoptria falsella* (D. & S.) on an old airfield at Bradwell-on-Sea, Essex.

M. GANDY reported having seen *Apatura iris* (L.) at Bookham Common, drinking from a puddle.

E. H. WILD reported that B. Goater had taken *Thalera fimbrialis* (Scop.) at Dungeness and that he himself had identified, before it escaped, *Trichoplusia ni* (Hübner) there.

J. MUGGLETON then gave an illustrated talk entitled "*Adalia*, the many patterned ladybirds".

11th September 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

The President announced with great regret the deaths of Cyril O. Hammond, Major General Sir George Johnson, D. F. Newman and H. G. Tunstall. Members stood in respect.

EXHIBITS

Rev. D. J. L. AGASSIZ – Specimens of *Swammerdamia passerella* (Zett.) (Lep., Yponomeutidae) bred from *Betula nana* from Inverness; the larvae were found in Sept. 1979. Also specimens of *S. pyrella* (Vill.) and *caesiella* (Hübner) for comparison, as the species has been confused with them. The only British specimen previously known was bred by Stainton in 1870 and named by him *nanivora*.

Dr. A. A. ALLEN – (i) A specimen of *Agdistis bennetti* (Curtis) (Lep., Pterophoridae) caught at actinic light in a wooded part of Brownsea I., Dorset, on 22.viii.1980. During August 1979 the exhibitor had swept a small number of this species from a small growth of sea-lavender some half a mile away.

(ii) A male example of *Barichneumon heracliana* (Bridgman) bred from a pupa 14.viii.1980 of *Depressaria pastinacella* (Dup.) in the company of others in a stem of (?) *Heracleum* on 4.viii.1980 at Shaldon, Devon. It was curious how a few stems contained several pupae while others were empty. The parasite has been recorded from other Depressariinae.

R. BRETHERTON – Six or 8 larvae of *Palpita unionalis* (Hübner) (Lep., Pyralidae) from ova laid on 7.viii.80, by a captured female.

I. BRYDON exhibited a copy of Edward Newman's *Illustrated Natural History of British Moths* (1869 edition), with interleaving, and requested information about T. B. Summerfield, its previous owner. Original notes probably by Summerfield were entered on the blank interleaves. Later the book was given at Christmas 1920 to Robert Edward Williams by his father and E. Crabbe, F.E.S.

R. K. MERRIFIELD – (i) Two large Diptera from a meadow in a valley at Mylor, Cornwall (SW 794 368) now being drained and cleared for market gardening, *Asilus crabroniformis* L., the largest of this group (dry weight 74 mg), a predator on grasshoppers, other Diptera and bees and wasps, and *Tabanus sudeticus* Zell., an even larger bloodsucking fly (dry weight 120 mg), also, for comparison, an example of the largest British Dipteron, *Tipula maxima* Poda, a species also occurring at Mylor though the example shown was from the Isle of Wight.

(ii) A rare Tiger beetle, *Cicindela germanica* L., from the coast of the Isle of Wight, together with a fly whose head was crushed in its mandibles when the beetle was put in the killing-bottle; also a large female of the ghost swift moth (*Hepialus humuli* (L.)) taken in Pollards Wood, Bucks in June, 1980.

COMMUNICATIONS

Various members reported the capture of migrant Lepidoptera during August, the species being *Eublemma parva* (Hübner), *Heliothis peltigera* (D. & S.), *Rhodometra sacraria* (L.), *Palpita unionalis* (Hübner). There were also signs of a third wave of immigrants just beginning, with first reports of *Nomophila noctuella* (D. & S.) and *Macroglossum stellatarum* (L.). Divergent accounts of the abundance of *Autographa gamma* (L.) were given by members from different parts of England. The spreading westwards of *Euproctis chrysorrhoea* (L.), the brown tail moth, were confirmed by Dr. A. A. Allen who reported its capture at Dawlish, Devon.

K. EVANS stated he had put back at the site of capture 8000 larvae of *Clostera anachoreta* (D. & S.) after breeding from a single female caught at Dungeness a year before. Eggs of this stock were noted to be fertile. Conservationists prone to criticise collectors were asked to note and emulate if capable of similar action.

Slides were then exhibited by R. K. MERRIFIELD, A. A. ALLEN, E. P. WILTSHIRE and I. BRYDON and were warmly applauded by an appreciative audience.

25th September 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

EXHIBITS

Col. A. M. EMMET – Two species of *Prunus*-feeding *Coleophora* (Lep., Coleophoridae) which were added to the British list in 1979: (i) Five *C. adjectella* H.-S. reared 7-14.vii.80 from larvae collected at Benfleet, Essex on 1.x.1979; the species was previous confused with *C. badiipennella* (Dup.); and

(ii) Nine *C. prunifoliae* Doets reared 2-13.vii.80 from larvae collected likewise at Benfleet. This species was first recognised as British in the West country by R. Heckford. *C. prunifoliae*, *C. cerasivorella* Packard and *C. coracipennella* (Hübner) were formerly lumped together under the name *nigricella* (Stephens). One can only distinguish the adults of these three species by dissection, but probably there are small differences in the early stages. The exhibitor hoped that a forthcoming field meeting at Benfleet would give an opportunity for further study of such distinctions.

R. FAIRCLOUGH – Specimens of *Nemaxera betulinella* (F.) (= *corticella* (Curtis)) found on oak trunks in fields at Leigh, Surrey, in late July; on seven trees out of fifteen examined, twenty-six were found 28-31.vii. A month later only two moths were found. Also a live female *Spodoptera exigua* (Hübner) found in his home trap in Surrey on 20.ix.

A. J. HALSTEAD – A female *Metoeus paradoxus* (L.) (Col., Rhipiphoridae) found near the entrance of a wasp-nest (*Paravespula vulgaris* (L.)) at the Royal Horticultural Society's gardens at Wisley, Surrey, 12.viii.1980. This widespread but uncommon beetle lays its eggs in rotten wood in the late summer/autumn. These hatch in the following year and the first instar larvae attach themselves to wasps foraging for wood-fibres for nest-building and are carried back to the nest. Once inside the nest, the *M. paradoxus* larva enters the body of a wasp-larva and starts feeding as an endoparasite. At the end of the first instar the larva emerges from its host, and, after shedding its skin, continues feeding as an ectoparasite on the wasp larva. Eventually the wasp larva is completely eaten and the beetle pupates in the wasp comb.

I. F. G. McLEAN – Two Diptera (Empididae: Hemidrominae), both found in Northants., at Cosgrove beside the river Tove, a locality which represents a considerable southward extension of their known range: *Hemerodromia baetica* Collin and *Wiedemannia lota* Haliday. The former was swept from short vegetation immediately beside the river, while the latter was "skating" on the water-surface close to the bank.

MEMBERSHIP

A. M. de Sium and A. Raymond were declared elected members.

ANNOUNCEMENTS

J. Muggleton announced that at the joint meeting with the Royal Entomological Society on December 17th the title of the talks would now be "Insect-host relationships"; for the host society Dr. V. F. Eastop would speak on insect-plant relationships and it remained for our Society to provide one or two speakers to talk briefly on insect-insect relationships.

At the March 12th young members' meeting the second speaker would be Mark Hadley, on Eastbourne moths. Suggestions for speakers or topics, and for/or volunteers for the 1981-2 programme of talks were asked for.

COMMUNICATIONS

M. CHALMERS-HUNT reported that *Autographa gamma* (L.) had been very plentiful flying by day in early September in Northumberland, likewise *Cynthia cardui* (L.), another immigrant. E. WILD mentioned that 2 specimens of *Dia-chrysis orichalcea* (F.) a less frequent immigrant had been recently reported from the New Forest, but his own sojourn in the Isle of Wight had been marred by strong winds. Col. A. M. EMMET stated that *Udea ferrugalis* (Hübner) had been the commonest moth on the wing in Wales this month. Various other members reported observations of other immigrants including P. SOKOLOFF's record of *Palpita unionalis* (Hübner) taken on the Victoria-Ramsgate train at Herne Hill, Kent.

Dr. D. LONSDALE then gave an illustrated talk on the natural history of the felted beech coccus. This proved to be a fascinating talk on aspects of the ecology of the beech tree in England.

The numerous questions which those present posed indicated the interest the talk evoked.

With reference to the observation of the President on *Nemaxera betulinella*, Col. EMMET remarked that the observation of this moth on oaks was of interest as the classical foodplant in Britain for it had been given previously as hornbeam.

A report by a member on the recent field meeting at Dungeness stated that though 32 lights were employed, a harvest of only twenty-two species of moths was achieved.

9th October 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

EXHIBITS

Dr. A. A. ALLEN — Two local species of Microlepidoptera, (a) *Epermenia aequidentellus* (Hofmann) (Epermeniidae), captured 3.viii.1980 at actinic light, Dawlish, Devon, and (b) *Eutromula pariana* (Clerck) (Glyphipterigidae) having been bred 27.viii.1980 from a larva found, with others, on a weather-beaten *Malus* tree at Eastbourne, Sussex. Also (c) a female *Apanteles ferrugineus* Marshall (Hym., Braconidae) swept 28.v.1980, Brownsea I., Dorset. Its bright testaceous thorax readily permits recognition among its congeners, but it appears to be an elusive species; it is gregarious, and has been bred from larvae feeding in stems of reeds and rushes.

E. S. BRADFORD — Mines made in the leaves of laurel (*Prunus laurocerasus*) by *Lyonetia clerkella*, from Alton, Hants., presented by David Lonsdale.

P. A. SOKOLOFF — A set specimen of *Noctua pronuba* (L.) (Lep., Noctuidae) attacked by larvae of the clothes moth *Tineola bisselliella* (Hummel). These had constructed tubes from the hair on the larger moth's thorax spun together with silk.

COMMUNICATION

At the recent Swanage meeting Mr. E. H. WILD reported that the migrant moths *Agrotis ipsilon* (Hufn.) and *Peridroma saucia* (Hübner) had been numerous.

Mr. J. P. EDWARDS then gave an illustrated talk on the role of hormones in the development of insects. The juvenile hormone had proved useful against insects which were pestilential in the adult stage, e.g. in combating infestations of hospitals by Pharoah's ant.

13th November 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

The President reported the death of Mr. W. H. T. TAMS, FRES, a special life member and a member of the Society since 1922.

EXHIBITS

Dr. A. A. ALLEN – Two species of parasitic Hymenoptera: (i) A female *Apanteles longicauda*, (Wesmael) (Braconidae) bred in the Spring of 1980 from a case of *Coleophora violacea* (Ström.) (Lep., Coleophoridae) collected by Mr. R. Fairclough near Benfleet, Essex, October 1979. Writing in 1972, Mr. Nixon was of the opinion (based on material he had seen) that this species was less commonly bred than closely related *Apanteles*.

(ii) A male *Barichneumon derogator* (Wesmael) (Ichneumonidae), swept on the outside of a wood at Pluckely, Kent, 15.viii.1980. The species seems very rare as there are but 5 examples in the National Collection, B.M.(N.H.).

Mr. R. DYKE – A specimen of *Schrankia taenialis* Hübner with very pale ground colour taken in July 1980 from Broxbourne Woods, Herts. This is the type locality of *Schrankia intermediaris* Reid and so the identity of the species is of some interest. Genitalia drawings of this and another specimen, both males, have been made and they appear to be identical with *taenialis*. A request has been made to see the type slide of *intermediaris* for comparison. There are old records of *taenialis* from this locality.

Rev. D. AGASSIZ – The British species of *Metzneria* (Lep.) together with *M. igneella* (Tengst.) from Scandinavia. A specimen exhibited as *M. neuropterella* (Zeller) from Wiltshire by K. Bland at the Annual Exhibition may be this species which would be new to Britain. [See 25th November meeting.]

Mr. H. GODFRAY – *Phyllonorycter messaniella* (Zeller) bred from *Betula papyrifera*, an unusual host plant. Bred from the mines were the Eulophid, *Hemiptarsanus unguicellus*, a common parasite of herbaceous leafminers but not known from leafminers of trees.

MEMBERSHIP

The following were declared elected: Messrs. D. W. Baldock, P. Bassett, S. P. Garland, Marrin Moore, Derek Moore and S. Church.

ANNOUNCEMENT

Mr. G. Prior announced that a quantity of "separates" given by the late C. G. M. de Worms were available to members without charge.

COMMUNICATIONS

The President, Mr. R. FAIRCLOUGH, reported that despite the very cold weather recently *Brachionycha sphinx* (Hufn.) had arrived at his MV trap at Leigh, Surrey. Mr. E. H. WILD reported that an example of this species was taken by him at Selsdon, Surrey on 12.xi.80, a first record there.

DISCUSSION

There followed a short discussion on the Annual Exhibition 1980.

SLIDES

The meeting concluded with some excellent slides offered by Mrs F. MURPHY, Dr. A. A. ALLEN, Mr. D. WILSON and Mr. K. MERRIFIELD.

27th November 1980

The President, Mr. R. FAIRCLOUGH, in the chair.

EXHIBITS

Dr. M. G. MORRIS – A female of the weevil *Hypera meles* (F.) (Col., Curculionidae) and, for comparison, a female of the common *H. plantaginis* (Degeer). The *H. meles* was beaten from Ivy (*Hedera helix*) growing on a wall at Furzebrook, Dorset on 24.iv.1979. The *H. plantaginis* is from Alum Bay, Isle of Wight, 20.v.1966. The differences between the two species were described very fully by A. A. Allen (1972) "A Contribution to the knowledge of *Phytonomus meles* F. (Col., Curculionidae) in Britain." *Entomologist's Rec. J. Var.* 110-113. Microscopically, the shape of the scales covering *H. meles* – best described as like an inverted V – is perhaps the most characteristic and unmistakable character.

H. meles is a rare species in Britain and very few specimens have been taken. Records noted by Allen (loc. cit.) include Ross, Selby, Yarmouth and Foxley Wood (Norfolk), Coulsdon, Guildford and Oxshott, Wicken Fen and two more doubtful MS records. Mr. Appleton took it a few years ago in S. Hants. The larva feeds on a range of leguminosae.

Mrs. WARDLAW – A pupal case of the Large Blue Butterfly – *M. arion* (L.) taken 11.vii.80 at St. Alvère, France and an Ichneumon wasp, *Neotypus coreensis* which had emerged therefrom. There are only 3 known specimens of this wasp from Europe.

Rev. D. AGASSIZ – A similar exhibit to that shown at the previous meeting but with some correction of names. It had been found that the specimen of a *Metzneria* species taken in Southampton 1.vii.1971 at light is also *aprilella* (H.-S.) = *igneella* (Tengst.). *M. neuropterella* (Zeller) from the Society's collection were shown for comparison. The larva of *aprilella* feeds on *Centaurea*, the seedheads of which should be collected now.

Mr. A. STUBBS – a display Case of Diptera and other insects was shown by Mr. I. McLean and Mr. A. Stubbs on behalf of the Nature Conservancy Council from the North Kent marshes and annotated to illustrate the Red Data Book species.

MEMBERSHIP

The following members were declared elected: Miss M. Lawrence, Messrs. S. A. Painter, P. R. Moseley, W. Jagger, P. Q. Winter, G. A. Collins, Willy de Prinz, T. M. Melling, K. E. J. Bailey and Dr. T. A. N. Mann.

COMMUNICATIONS

Mr. R. F. BRETHERTON appealed for records of the immigrant Lepidoptera to be sent either to him or to Mr. J. M. Chalmers-Hunt.

Mr. E. H. WILD reported the presence on 23.xi.80 at his Selsdon, Surrey trap of *N. pronuba* L.

Mr. G. PRIOR reported that on a recent visit to Norwich Museum he noted that insect drawers were protected against *Anthrenus* with ampoules of phenol dissolved in water.

Mr. J. M. CHALMERS-HUNT warned that phenol should not on any account be used with the Emerald moths for the colour would be destroyed. Mr. B. GOATER gave it as his opinion that the use of para-dichloro-benzene induced "greasing" in some specimens and reported that he had proven such to his satisfaction.

There followed a lecture "What happened to the Large Blue" given by Dr. B. R. Benham and accompanied by slides.

EDITOR'S REPORT 1980

Volume 13 of the Proceedings and Transactions was printed in two double parts, published in April and at the annual exhibition on 1st November. The index is in the press. We published 136 pages of text, four coloured plates of British lepidopterous larvae in the series by G. H. Haggett, and nine other plates. The Transactions included a primary taxonomic paper "a revision of the pantropical genus *Tathorhynchus* Hampson" by A. H. Hayes. Such papers indicate that our journal is circulated widely enough to be available and that it is abstracted and its contents thereby made known. The second part of the President's address by Rev. D. J. L. Agassiz, rich in useful text illustrations, is mainly a supplement to our recently republished collection of illustrated papers on British microlepidoptera.

On returning from the Annual Exhibition I was laid low by a severe attack of shingles; its prolonged after-effects have obliged me not merely to delegate editorial duties to my panel of assistants, who responded willingly to my appeal, but to resign from the chair completely. I am grateful to all who offered their help, but I think that members will be especially indebted to Raymond Uffen for agreeing to become Editor, and I believe that he will prove to be a competent successor. I must here also mention two members, resident in my neighbourhood, Brian Baker and Martin Albertini, who undertook laborious duties when I fell by the way. I hope to reappear at indoor meetings as a back bencher after a few months. E.P.W.

TREASURER'S REPORT 1980

Although an income excess of nearly £2400 may appear to indicate a very sound year financially, a more critical look at the figures will show that we cannot afford to be too complacent. Our basic source of income must be considered as our receipts from members' subscriptions, the new rate from January 1st, 1980 increasing these by about £770 to just under £2800. However, the cost of producing and distributing the Proceedings to members was approximately £2700 and other general expenses of membership amounted to about £1000, not including the large but non-recurring cost of a new addressing machine and a new membership list system. This gives a membership running cost of £3700 against total receipts from subscriptions of £2800. The excess was mainly due to the extra cost of Parts 3/4 Proceedings with coloured and black and white plates and a number of text figures, which was financed out of the very generous legacies and donations received during 1980. These included a legacy of £500 each from the late Lady Wenorah Ansorge and the late Baron C. G. M. de Worms and one of £50 from the late Mr. H. G. Tunstall and also donations varying in amount from £50 to 50p received from a number of members. This has enabled all this year's surplus from the sale of "Illustrated Papers" and "Field Guide" and some of our investment income to be kept in hand to meet the cost of other planned special publications. Half of the loan made by the Royal Society towards the cost of "Field Guide" has now been repaid, and it is intended to repay the balance of £500 during 1981.

An investment review was carried out during 1980, and a number of changes were made, the overall result being a combined net capital appreciation of £1000 in the General Fund and the Hering Memorial Research Fund.

Our especial thanks are due this year to Mrs. S. B. Walker, the wife of our Assistant Treasurer, who, when her husband had to leave for a year abroad on business, took over his work. Our thanks are also due once again to our honorary auditors, for completing the audit in the very short time available.

British Entomological and Natural History Society
BALANCE SHEET as at 31st December 1980

1979	LIABILITIES	1980	
£ p		£ p	£ p
4863 12	<i>General Fund</i> — Opening balance	8654 85	
1667 00	From Reserve Fund	854 30	
2124 73	Excess of Income over Expenditure	2377 74	
	Gain on sale of investments	887 84	
<u>8654 85</u>			12774 73
2328 77	<i>Reserve Fund</i> — Opening balance	854 30	
192 53	Add interest		
2521 30		854 30	
1667 00	Less used for purposes reserved	854 30	
<u>854 30</u>			
428 07	<i>Library Fund</i>	192 57	
53 40	Add interest and income	71 95	
481 47		264 52	
288 90	Less expenditure	149 06	
<u>192 57</u>			115 46
1874 19	<i>Housing Fund</i> — Opening balance	2072 19	
198 00	Add interest	236 00	
<u>2072 19</u>			2308 19
2396 00	<i>Hering Memorial Fund</i>	2476 57	
	Gain on sale of investments	172 52	
325 12	Add interest	282 41	
<u>2721 12</u>		2931 50	
244 55	Less expenditure	352 00	
<u>2476 57</u>			2579 50
			£17777 88

1979	ASSETS	1980	
£ p		£ p	£ p
1393 74	<i>Stock</i> — Field Guides at cost	1064 88	
	“Pug” plates at cost	632 50	
	Coloured Christmas Cards at cost	183 50	
			1880 88
	(The value of the library, collections, ties and other publications is not included in accounts)		
	<i>Investments at Cost</i> (Details appended)		
7029 85	General Investments	7916 23	
1995 96	Hering Memorial Fund Investments	2169 94	
<u>9025 81</u>			10086 17
	<i>Liquid Assets</i>		
91 78	PO Savings Investment Account	105 43	
662 75	Debtors and advance payments	698 10	
3288 94	Cash on Deposit Account	6010 54	
1444 65	Cash on Current Account	409 07	
<u>5488 12</u>		7223 14	
262 55	Less Subscriptions paid in advance	187 41	
	Advance receipts for “Pug” Book	664 90	
1394 64	Amounts owed and provisions	560 00	
<u>1657 19</u>		1412 31	
830 93	Net liquid assets		5810 83
			£17777 88

INCOME AND EXPENDITURE ACCOUNT for 1980

1979	INCOME	1980
2022 06	Subscriptions	2792 44
148 50	Legacies & donations	1122 08
837 36	Interest & dividends on investments) 1780 92
344 46	Interest on deposit & PO Inv. a/c	
	Christmas Cards — Surplus on sales	94 49
	Annual dinner — Surplus	10 16
61 10	Sale of ties — Surplus	51 00
175 02	Cabinets & Collections — net	35 70
237 23	Publications Account — Surplus	
<hr/>		<hr/>
3826 23	TOTAL INCOME	5886 79
<hr/>		<hr/>
2539 26	<i>Excess of Income over Expenditure</i>	2628 74
198 00	Interest apportioned to Housing Fund	236 00
24 00	Interest apportioned to Library Fund	15 00
192 53	Interest apportioned to Reserve Fund	
<hr/>		<hr/>
		251 00
2124 73	BALANCE being excess of Income over	
	Expenditure transferred to General Fund	2377 74
<hr/>		<hr/>

1979	EXPENDITURE	1980
614 68	Rent and insurance	597 07
190 89	Postage and miscellaneous expenses	220 48
	Office machinery (Addressing & Members' list)	676 43
	Publications Account — Cost c/d	1537 78
208 31	Stationery	144 68
38 50	Subs. to other societies	63 50
217 57	Indoor meetings and exhibition (net)	18 11
16 01	Christmas Cards loss	
1 01	Annual dinner loss	
<hr/>		<hr/>
1286 97	TOTAL EXPENDITURE	3258 05
<hr/>		<hr/>

In our opinion the annexed Balance Sheet gives a true and fair view of the state of the Society's affairs as at 31st December 1980 and the Income and Expenditure Accounts give a true and fair view of the Society's results for the year.

A. J. Pickles, F.C.A.
J. L. Messenger

Schedule of Investments at cost as at 31st December 1980

General Investments of the Society

£800	Agricultural Mortgage Corporation 9½% Stock 1985-8	£646.49
1010	Drayton Premier Investment Trust 25p Ordinary Shares	1398.21
1150	Finance for Industry 13% Stock 1981	1153.71
1250	Greater London Council 9½% Stock 1980-82	1100.14
130	Shell Transport & Trading 25p Ordinary Shares	477.79
150	Unilever 25p Ordinary Shares	248.45
2969.99	Treasury 13¼% Loan 1993	2891.44
		<hr/>
		TOTAL £7916.23
		<hr/>

Hering Memorial Fund Investments

£800	Agricultural Mortgage Corporation 9¾% Stock 1985-8	£646.48
300	Greater London Council 9½% Stock 1980-82	291.97
189	Midland Bank £1 Ordinary Shares	459.66
280	Shell Transport & Trading 25p Ordinary Shares	771.83
TOTAL		<u>£2169.94</u>

PUBLICATIONS ACCOUNT for 1980

1979		1980
	<i>Proceedings</i>	
1703 03	Cost of Production	2829 12
359 86	Less Proceeds from sales	<u>351 85</u>
1343 17	Net cost of publications supplied free to members	2477 27
	<i>Field Guide</i>	
1667 00	Cost of production less Royal Society Grant	
	Additional costs	94 32
	Cost of stock held 1 Jan.	<u>1393 74</u>
		1488 06
1393 74	Less Cost of stock held 31 Dec.	<u>1064 88</u>
273 26	Cost of sales	423 18
1039 24	Proceeds from sales	<u>1266 62</u>
765 98	Surplus from sales	843 44
	<i>Illustrated Papers</i>	
1067 14	Surplus from sales	<u>421 89</u>
1833 12	Total Gross Surplus from Special Publications	1265 33
489 95 surplus	Gross Result over all Publications	Cost <u>1211 94</u>
252 72	Cost of Distribution	325 84
	Net Result	
237 23 surplus	to Income & Expenditure a/c.	Cost <u>1537 78</u>

COUNCIL'S REPORT 1980

1980 may be remembered as a poor year generally for insects, but for the Society it has been both busy and profitable.

Membership remains steady. Although 13 members died, 21 resigned and 20 were struck off, 58 new members were elected.

Among the Officers of the Society, several changes have had to be made for 1981. Mr. Wiltshire has had to give up as Editor because of illness. He has done much to improve the quality of the Proceedings. We wish him a full recovery. Mr. Uffen has kindly offered to fill the breach this year. Mr. Knill-Jones has had to resign as Lanternist because of pressure of work. Mr. Hadley has taken over. Your Secretary is shortly moving to "pastures new". We also offer special thanks to Mrs Walker who has carried out the exacting role of Assistant Treasurer while her husband was abroad. Mr. Messenger is retiring as Auditor and we thank him for his long and valuable service. Mr. Bell would be prepared to replace him.

The indoor meetings programme has been of exceptional interest, covering a wide range of topics. It is strange that so few papers on British Lepidoptera are available from members, 80% of whom are lepidopterists. Why are they so reluctant to come forward? Field meetings have been quite well attended, but here again Mr. Jackson finds great difficulty in getting volunteers to lead meetings and in completing his programme.

The joint meeting with the R.E.S. held at Queen's Gate was a most enjoyable evening with excellent papers from several speakers on the relationship of insects with other life forms. The five day meeting at Rogate proved most successful.

The Editor is again to be congratulated on the excellence of the Proceedings. The sales of the Illustrated Papers has been very profitable and only 15 unsold copies remain while 356 copies of The Field Guide have been sold. Advance orders for the Pug book are going very well and it is hoped that it will be available in the very near future. We thank all those responsible for the production of this work. We are grateful to Mr. Bretherton for dealing with the very heavy additional burden of distribution.

The Annual Dinner was enjoyed by those who attended and numbers (78) were well up on the previous year. We thank Dr. McNulty for arranging this.

Mr. Ken Evans organised the Annual Exhibition with his usual skill. It was attended by 305 members and friends. Despite the poor year the number and quality of the exhibits made it a splendid day. Thanks are due to all those who contributed, the exhibitors, Mrs. Murphy and her team of caterers, our reporters, Mr. Wilson for photographing selected exhibits, and to those who manned the recording and sales tables.

During the year Council has watched carefully the progress of the Conservation of Wild Animals and Plants Bill, for which it has offered advice. We are concerned that the banning of the use of traps and some other features proposed should not be applied to invertebrates. We have become part members of the World Wildlife Link so as to get a stronger representation for our views.

In the next Proceedings, members will be informed of an approach to the Society from the Army Conservation Officers. Ministry of Defence land in many parts of the country will be opened, on application, to collectors who are invited to help improve the knowledge of the distribution of insects in many areas about which little is known. Col. Clayden will speak at one of our meetings on this subject.

LIBRARIAN'S REPORT

This is my second report as Librarian. Since my report to the Annual General Meeting last year certain improvements have been made in your Library. A further 120 ft run of shelf space has been added and the De Worms collection of books, journals etc., has been labelled, catalogued and incorporated into the Library. I made application to the British Library and they agreed to make the Society a grant of £1500 for the rebinding of some of our more valuable books. As a result 53 of these are now at the binders being re-bound and I expect to receive them back in February.

Two Library Committee meetings have been held and as a result Council has decided to dispose of duplicate copies which are surplus to our needs. The membership will be given the first opportunity to purchase these, I hope it will be possible to make an announcement in the next issue of the Proceedings giving details of what is available. I must stress that these will not be the popular and frequently borrowed British journals *The Entomologist's Record*, *Entomologist's Gazette*, *The Entomologist* and *The Entomologist's Monthly Magazine*.

The matter of the exchange of our Proceedings with other British Journals has been examined and we have discontinued this exchange in those cases where

the other party has sent us nothing or where the matter sent contained virtually nothing of interest in the field of entomology or natural history. We have made new exchange arrangements with the Dorset N.H.S., The Suffolk N.H.S., and the A.E.S. We received long runs of the back numbers of these three very good publications from the library of Baron de Worms; we have also entered, at their request, into an exchange with the Société Linnéan de Lyons.

I would like to thank the following for their gifts of books, slides etc., H. N. Alston, P. Sokoloff, I. Brydon, E. Classey, E. Wiltshire, S. N. A. Jacobs and Mrs. F. Murphy. I would also like to thank S. Miles, A. Stubbs, I. McLean, W. Parker, P. Sokoloff and, of course, Eric Bradford the Curator, for their help in re-organising the Library.

We have a very good collection of first class coloured slides consisting of 92 butterflies, 227 macro-moths, 180 larvae and 102 micro-lepidoptera. May I appeal to members to donate further slides of the orders Diptera, Coleoptera, Odonata, Hymenoptera, to make our collection fully comprehensive.

And lastly, as a great deal of work has gone into re-organising the Library, may I appeal to all members to use it more frequently. We have a very comprehensive library of books and periodicals and a fine collection of slides. Nothing gives a good Librarian more pleasure than to have his services in demand.

G.P.

CURATOR'S REPORT

It is a pleasure to report the completion of rehousing of the Andrews collection and other Diptera. All are now housed in a fine forty-drawer unit, spaces being left for those British species not yet represented in the collection. I must thank Mr. P. J. Chandler for the care and time he has devoted to the transferring of the specimens. Steady progress continues on the remaining orders.

Three bequests were made to the Society during 1980. Baron de Worms left, apart from his large and valuable library, various pieces of equipment, nets, store boxes etc. Some of these were sold off at the Annual Exhibition, as well as several other store boxes surplus to the Society's needs. Cyril O. Hammond left his collection of Odonata, which, when incorporated with the Society's, will give us one of the finest collections of this group of insects. Mr. W. L. Coleridge left his collection of British and continental butterflies to the Society. Few bequests or donations made to the Society during the last decade have included butterflies, so this collection will be most welcome.

At the Annual Exhibition in Chelsea Town Hall on 1st November, a presentation was made to Mr. Stig Torstenius. This consisted of Russwurm's *Aberrations of the British Butterflies*, which contained an inscribed leaf, signed by the president, thanking him on behalf of the Society for his generous gift of Scandinavian Lepidoptera. Another part of the collection was displayed again this year by Mr. S. Torstenius and Mr. C. B. Ashby. One more ten-drawer Hill unit has been made available for this collection.

I would like to thank on behalf of the Society Mr. S. N. A. Jacobs and Mr. P. Sokoloff for their donations of insects to the collections.

Once more I would like also to thank the assistant curators, Mr. L. Christie and Mr. C. B. Ashby for their continued support.

E.S.B.

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

A short list of five applications was considered by the Committee and the selection was based strictly on the priorities laid down. Two awards were made as follows:—

- (1) £200 to Miss Graciela Valladares for the study of Agromyzidae in Argentina. Her work is known to Dr K. Spencer, a Committee member, and he commends it highly.
- (2) £50 to Mr Leonard McLeod, a member of the British Entomological & Natural History Society, for the study of Agromyzidae in France, where he lives and works. Recently he discovered the life history of *Ophyomia improvisa* Spencer, a species previously known only from the male and female type specimens. He plans to carry out further research into this species and its relatives.

With regard to previous awards, Don J. F. Sanchez, the Spanish entomologist who received his award in 1979, spent part of it collecting in Andorra with Dr P. J. L. Roche, a member of this Society. I have received a preliminary report from Philip Sterling, who led the expedition of Oxford undergraduates to the Scottish islands last summer. They carried out most of their programme in spite of atrocious weather and made a number of new records. I have received two more "separates" on Diptera from Dr R. H. L. Disney, Warden of Malham Tarn Field Centre, in which he acknowledges financial help from the Fund.

With regard to the future, I have already received two promising applications for 1981/1982

A.M.E.

BOOK REVIEW

A Label List of Butterflies (Rhopalocera): North, Western & Southern Europe, compiled by Peter W. Cribb. Pamphlet No. 11 (revised 1981). Amateur Entomologists' Society, Hanworth, Middx., England. 20 pp. £1.50.

This list, first published in 1966 and revised in 1970, has been again up-dated, mainly to include species and sub-species recently recognised in the area and the extensive changes in nomenclature introduced by Higgins and Riley in their 4th (revised) edition of their "Field Guide to the Butterflies of Britain and Europe". As its title suggests, the list does not cover the North African species and sub-species, except, a little oddly, those of the Canary Islands and the Azores.

The author has, however, also not followed the "Field Guide" in its order of families or, at all closely, in its order of genera and of the species within them. He has also listed as good species half a dozen taxa which are treated in it as sub-species; and, although in total he names in his area about as many sub-species and dimorphic forms, his selection of them is often different. One may personally sympathise and agree with the ideas implicit in these differences; but they have the effect of making the label list somewhat awkward to handle along with the "Field Guide", which, for good or ill, is likely to remain for some years the bible for most collectors of European butterflies.

One European species, *Pseudaricia nicias* Meigen (Silvery Argus), has been omitted, presumably accidentally, and a small number of spelling mistakes have escaped the notice of the proof reader. The value of the list for labelling could have been increased by securing a more exact alignment of letters and words, and by the use of larger lower case type for the names of the species, sub-species and forms. A welcome innovation is the insertion of the date of the scientific names of both genera and species.

R.F.B.

B.E.N.H.S. PUBLICATIONS – 1981 MEMBERS' PRICE LIST

For non-members add 50%. Postage and packing extra.

PROCEEDINGS: SLENHS series

	<i>per volume</i>			<i>per volume</i>	
	£	p		£	p
A. For sale separately only to members, or in a long run:			C. 1924-5 to 1935-6;		
1921-2; 1936-7 to 1943-4;			1946-7 to 1962		4-00
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A special discount of 20% will be allowed on sales of 10 or more consecutive volumes. Separate parts of volumes so published can be supplied on demand at prices proportionate to those of the whole volumes (except 1963 and 1968, listed above). No copies are at present available of 1920-1, 1922-3, 1944-5.

THE NEW AURELIANS (1972)	1-00
ILLUSTRATED PAPERS ON BRITISH MICROLEPIDOPTERA (1978)	
for sale only to members	10-00
FIELD GUIDE TO THE SMALLER BRITISH LEPIDOPTERA (1979)	6-00
IDENTIFICATION GUIDE TO BRITISH PUG MOTHS (1981):	soft cover 4-00
	hard back edition 6-00

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological and Natural History Society announces that awards may be made from this Fund for the promotion of entomological research with particular emphasis on:—

- Leaf-miners,
- Diptera, particularly Tephritidae and Agromyzidae,
- Lepidoptera, particularly Microlepidoptera,
- General entomology,

in the above order of preference having regard to the suitability of candidates and the plan of work proposed.

Awards may be made to assist travelling and other expenses necessary to field work, for the study of collections, for attendance at conferences, or, exceptionally, for the costs of publication of finished work. In total they are not likely to exceed £250 in 1981/1982.

Applicants should send a statement, if possible in sextuplicate, of their qualifications, of their plan of work, and of the precise objects and amount for which an award is sought, to Lt.-Col. A. M. Emmet, Hon. Secretary, Labrey Cottage Victoria Gardens, Saffron Walden, Essex, CB11 3AF, as soon as possible, and in any case not later than 30th September, 1981.

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INSTRUCTIONS TO AUTHORS

Contributions must be double-spaced with 3 cm margins either side to facilitate marking up. They should be typed if possible. Layout should follow that of the journal, but apart from underlining scientific names, no marks should be made to define typeface.

Authors of original papers of more than one page qualify for 25 free reprints. Extra copies (prices on application) must be ordered when proofs are returned.

MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place 24th October, in Chelsea Old Town Hall.

Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings.

The current Programme Card can be had on application to the Secretary.

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Proceedings and Transactions of
The British Entomological and
Natural History Society



Price: £3.50

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1885	R. SOUTH, F.E.S. (dec.)	1951	T. G. HOWARTH, B.E.M., F.R.E.S., F.Z.S.
1886-7	R. ADKIN, F.E.S. (dec.)	1952	E. W. CLASSEY, F.R.E.S.
1888-9	T. R. BILLUPS, F.E.S. (dec.)	1953	F. STANLEY-SMITH, F.R.E.S.
1890	J. T. CARRINGTON, F.L.S. (dec.)	1954	STANLEY N. A. JACOBS, S.B.ST.J., F.R.E.S.
1891	W. H. TUGWELL, PH.C. (dec.)	1955	F. D. BUCK, A.M.I.P.T.G.M., F.R.E.S. (dec.)
1892	C. G. BARRETT, F.E.S. (dec.)	1956	Lt-Col. W. B. L. MANLEY, F.R.E.S.
1893	J. J. WEIR, F.L.S., etc. (dec.)	1957	B. P. MOORE, B.SC., D.PHIL., F.R.E.S.
1894	E. STEP. F.L.S. (dec.)	1958	N. E. HICKIN, Ph.D., B.SC., F.R.E.S.
1895	T. W. HALL, F.E.S. (dec.)	1959	F. T. VALLINS, A.C.I.I., F.R.E.S. (dec.)
1896	R. SOUTH, F.E.S. (dec.)	1960	R. M. MERE, F.R.E.S. (dec.)
1897	R. ADKIN, F.E.S. (dec.)	1961	A. M. MASSEE, O.B.E., D.SC., F.R.E.S. (dec.)
1898	J. W. TUTT, F.E.S. (dec.)	1962	A. E. GARDNER, F.R.E.S. (dec.)
1899	A. HARRISON, F.L.S. (dec.)	1963	J. L. MESSENGER, B.A., F.R.E.S.
1900	W. J. LUCAS, B.A., F.E.S. (dec.)	1964	C. G. ROCHE, F.C.A., F.R.E.S.
1901	H. S. FREMLIN, M.R.C.S., L.R.C.P., F.E.S. (dec.)	1965	R. W. J. UFFEN, F.R.E.S.
1902	F. NOAD CLARK (dec.)	1966	J. A. C. GREENWOOD, O.B.E., F.R.E.S.
1903	E. STEP, F.L.S. (dec.)	1967	R. F. BRETHERTON, C.B., M.A., F.R.E.S.
1904	A. SICH, F.E.S. (dec.)	1968	B. GOATER, B.SC., F.R.E.S.
1905	H. MAIN, B.SC., F.E.S. (dec.)	1969	Capt. J. ELLERTON, D.S.C., R.N. (dec.)
1906-7	R. ADKIN, F.E.S. (dec.)	1970	B. J. MACNULTY, B.SC. PH.D., F.R.I.C. F.R.E.S.
1908-9	A. SICH, F.E.S. (dec.)	1971	Col. A. M. EMMET, M.B.E., T.D., M.A.
1910-1	W. J. KAYE, F.E.S. (dec.)	1972	Prof. H. E. HINTON, PH.D., B.SC., F.R.S., F.R.E.S. (dec.)
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1916-7	HY. J. TURNER, F.E.S. (dec.)	1975	M. G. MORRIS, M.A., PH.D., F.R.E.S.
1918-9	STANLEY EDWARDS, F.L.S., etc. (dec.)	1976	W. G. TREMEWAN, M.I.BIOL.
1920-1	K. G. BLAIR, B.SC., F.E.S. (dec.)	1977	R. TUBBS, O.B.E., F.R.I.B.A., F.R.E.S.
1922	E. J. BUNNETT, M.A. (dec.)	1978	G. PRIOR, F.L.S., F.R.E.S.
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1936	M. NIBLETT (dec.)		
1937	F. J. COULSON (dec.)		
1938	F. STANLEY-SMITH, F.R.E.S.		
1939	H. B. WILLIAMS, LL.D. F.R.E.S. (dec.)		

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E. S. Bradford

A. H. Hayes

NEW FORMS OF *ACLERIS CRISTANA*

- | | | |
|--------------------------------|-------------------------------|----------------------------|
| 1. <i>palistriana</i> . | 7. <i>subochreanigrana</i> . | 13. <i>ochreafulvana</i> . |
| 2. <i>proinsulana</i> . | 8. <i>fulvopurdeyana</i> . | 14. <i>nigrofulvana</i> . |
| 3. <i>obscurana</i> . | 9. <i>prosubchantana</i> . | 15. <i>alisana</i> . |
| 4. <i>nigrosubcristalana</i> . | 10. <i>manleyana</i> . | 16. <i>nigrocapitana</i> . |
| 5. <i>fordana</i> . | 11. <i>dualana</i> . | 17. <i>albosericana</i> . |
| 6. <i>inornana</i> . | 12. <i>subxanthovittana</i> . | 18. <i>fulvosericana</i> . |

EDITORIAL

Our cover motifs this year have been reproduced from papers on insects new to Britain. The place of honour has yet to be booked for our next issue. Papers and short notes will be welcomed and should be sent in as soon as ready. March publication depends on your contributions.

Amongst those recorded as new members in our proceedings, I note the name of Dr. Klaus Sattler, the British Museum microlepidopterist. Dr. Sattler won his tibial spurs as a British field microlepidopterist by adding *Scythris inspersella* (Hübner) to the British list on a visit to Walsingham country (see 1980 exhibition report). I just hope that he obtained the approval for this incursion from the great man's ghost. Who knows what valuable drawers of types may otherwise mysteriously slam shut in the night at the BM.

FROM 1 January 1982 THE ENTRANCE FEE IS £1 and annual subscriptions are: ORDINARY AND CORPORATE MEMBERS £9.50, COUNTRY MEMBERS £5.50, JUNIOR MEMBERS £2.50. Members should alter their bankers' orders or send their subscriptions to Hon. ASST. TREASURER, BELLARGUS, 9 ELMS-FIELD WAY, SANDERSTEAD, SURREY by 1 JANUARY.

PRESIDENTIAL ADDRESS

by R. FAIRCLOUGH

29th January 1981

I. TOPICAL REMARKS

Our Officers and Council, having worked hard throughout the year, have had much to report. The president, having done nothing, has exactly nothing to report. I can point to the fact that I have been fortunate enough to attend every meeting during my year of office, but that, it can be argued, is quantity not quality. May I say that I have enjoyed the year; firstly for being so surprisingly honoured; secondly because of the help and support of the officers and council who have endured my blundering direction with rare good humour, as indeed has the wider audience at our ordinary meetings.

As you have heard, there are to be changes in some departments. Ted Wild, who has by now caught every moth in Selsdon, is seeking new territories. He has been our secretary for three years and I am sure that you will all join with me in thanking him for his services. We wish him and his wife well in their retirement to, we hope, the right sort of home nicely located on a migration route. We are grateful to Frances Murphy for undertaking to replace him.

Our editor, Ted Wiltshire, has been forced to hand over his duties following a bad attack of shingles. Despite printing problems he produced the Proceedings and Transactions efficiently and with the minimum of fuss. With our thanks for all his work go our best wishes for his rapid and complete recovery. We also wish Raymond Uffen well on his taking over the wheel in the middle of the voyage to the next publication.

Our lanternist Sam Knill-Jones had to resign during the year and deserves our appreciation. Mark Hadley has kindly taken over.

It is impossible to thank by name everybody who ensures that the Society functions smoothly. To everyone, whether carrying out a vital office or doing one of the various tasks which, for example, make the Exhibition a success, we are indeed grateful.

Mentioning the Exhibition reminds me that, on that occasion and at the Dinner, our benefactor from Sweden, Stig Torstenius, appeared in the flesh, obviously enjoying being with us as much as we appreciated his lively presence.

We have once again suffered a heavy loss during the year, the deaths of thirteen members having been announced. That of Mr T.W. JEFFERSON took place in October 1979 but the news did not reach us until 1980. He was a Darlington lepidopterist who joined the Society in 1951. Bad eyesight for the last thirty-five years of his eighty year span curtailed his field-work,* but he was able to photograph the butterflies he bred, finding great satisfaction in this pursuit.

Mr COLIN KEITH-JOHNSON, a member since 1956, was a professional actor living in London whose interest was in the Lepidoptera. We lost two Oxfordshire members, both lepidopterists. They were Mr D.E. NEWMAN of Wallingford who became a member in 1949 and Mr A.S.R. RIPPON of Henley-on-Thames who joined in 1968.

Dr JOHN L. NEWTON joined the Society in 1945. He was a doctor in the prison service who attended our meetings and served on Council. His great interest was in Coleoptera. Unhappily the retirement to Norfolk to which he had looked forward did not last for long.

Mr F.M. STRUTHERS, a member since 1949, was formerly regular in attendance at our field meetings. It was at one of these at Newlands Corner in April 1961 that he took the only British specimen of *Pammene agnotana* Rebel, a pleasing capture for a lepidopterist.

Mr P.J. ROGERS joined us in 1961. He was a keen Hampshire lepidopterist often to be found in the field by day and night. He had travelled overland to South Africa with his family just before his death.

Mr CYRIL O. HAMMOND was one of our Honorary Members. We miss his quiet presence at these meetings. He was, of course, familiar to a vastly wider circle from his books on Diptera and Odonata. He enjoyed the six day field-meeting at Rogate in June, so that the news of his death in August came as a great shock to us all. A full obituary will appear in the Transactions.

Major General Sir GEORGE F. JOHNSON was a distinguished soldier, taking a prominent part in the release of Europe from Hitler's hordes and in the occupation of Berlin at the end of World War II. He was a long standing member, elected in 1945, with an interest in Lepidoptera, particularly the butterflies, and in ornithology. He lived in Cumbria.

Mr H.G. TUNSTALL, who joined the Society in 1934, was another butterfly-lover. Three years ago at the age of ninety he gave up his membership but we should remember him.

Mr W.H.T. TAMS was a Special Life Member, having been elected in 1922. He worked at the British Museum (Natural History) for over fifty years and many of us remember his unfailing kindness and helpfulness when we took our identification problems to him. For long years it was he who did the photography at our Annual Exhibitions. Here again we shall have a full obituary.

Mr D.L. COATES, elected in 1963, was a lepidopterist who had recently moved to Dunkeld from Aberfoyle where his trap produced some good records for South Perthshire, including the first records of *Acleris abietana* (Hübner) for Britain.

News of Mr AUSTIN RICHARDSON's death at the age of seventy-seven this month is the latest blow. He has been a well-known Gloucestershire member since 1942. We remember his large exhibits of Lepidoptera with their emphasis on regional forms as well as the many rarities he captured. He was an energetic man with wide-ranging interests, active to the end.

On a happier note, I have great pleasure in announcing that Council has nominated a new Honorary Member; Col. A.M. EMMET. He was president of this society ten years ago, and more recently he put his talents to good use for us in editing the revised *Field Guide to the Smaller British Lepidoptera*, a piece of work which is a model of its kind.

PRESIDENTIAL ADDRESS PART II

COLLECTING AND BREEDING

ACLERIS CRISTANA (DENIS & SCHIFFERMÜLLER),
WITH THE DESCRIPTIONS OF EIGHTEEN NEW FORMS.

by R. FAIRCLOUGH

Blencathra, Deanoak Lane, Leigh, Surrey.

It will come as no surprise to you that I am going to talk about this polymorphic lepidopteron. In so doing I am very conscious of the high standard of past presidential addresses. It would be highly satisfactory to be able to unravel the genetics of this moth as our president of three years ago did so ably for his butterflies, but this I cannot do. This is a plain tale of our work with the moth so far. "We" is used frequently below because I am acknowledging that my collector son, Alan, has had an equal part in the work. I keep the final records; the collection resides with me; but he is far better than father in the field and a necessary partner in our breeding enterprise.

I had intended at one time to talk only about the breeding of the moth, but there can be no offspring if one does not first catch the parents. I began to look for *cristana* in 1962, having bred one accidentally the previous year. Only five were caught from two trips late in the season, and few more the following year when Alan joined the activity. Five more seasons were to pass before we had settled to the routine of collecting from mid-August to mid-October and had become completely addicted. The moths are usually not out in any numbers before that date and there is a sharp fall in the catch by the third week of October. Exceptional weather produces the unexpected as in 1976 when we found the moth out on the 25th July; and in 1967 when I caught over one hundred between the 26th and 28th October, but that was the driest, warmest October of the century. Few are to be found in the spring, and the latest record in the field I have is 5th June 1979.

In the early years I studied the Sheldon papers where there is an excellent account of the moth's habits as well as a lot about the forms, but we were not at all clear as to the identity of some of our captures. A revelation occurred when I visited Lt. Col. W. B. L. Manley in 1967. He not only showed me his magnificent collection of *cristana*, but very kindly lent me the manuscript of what was to become, with a few additions, the "Guide to *Acleris cristana* (D. & S.)" (Manley 1973). Our collection was sorted out, and, stimulated by this access of new knowledge, we decided that in future we would add to the numbers recorded the form of each capture.

Fig. 1 is a histogram of our annual catches from 1968 to last year. At once it is evident that the numbers fluctuate widely as stated in Bradley, Tremewan and Smith (1973). Our experience however does not agree with their further statement that the moth is often common after a wet summer and autumn. The two dry hot years, 1970 and 1976, stand out. Moreover Manley made a record catch of some three thousand in that long fine summer and autumn of 1947. I suggest that the most important factor is the weather in the larval feeding time, April to July. All our figures show that cold wet weather then is fatal for many larvae and one has only to look at the years with poor results to realise that they fit my proposition. They were all bad years as regards the weather, and collectors of other insects will remember them as poor seasons.

To Sheldon, just over half a century ago, the New Forest, Folkestone and Epping Forest were where one caught *cristana* although he added that he had recently found a few in Surrey. Twenty years later Manley and Ford were proving

that Sussex and Surrey were remarkably good places for the moth and that rare forms were to be found north of the Thames. What of today? I have never been able to find one *cristana* in the New Forest. Folkestone has yielded very few with a complete blank in August 1976 when there was a spate of the moth elsewhere. Alan, following his removal to Essex in 1968, located the Epping population which was still going strong.

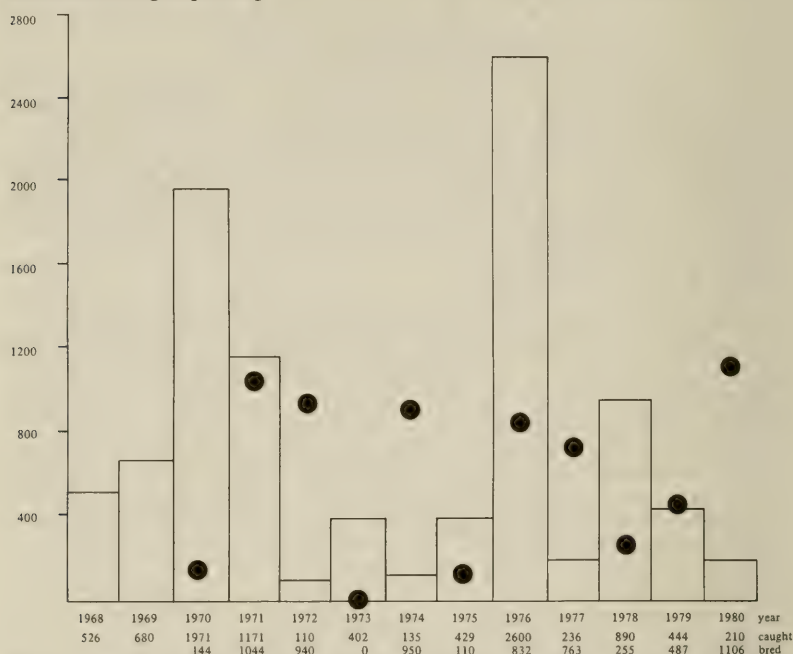


Fig 1. Histogram of annual captures of *Acleris cristana*. Spots are totals bred.

The moth is widespread for we have taken it in seventy-four different places. Most of these are in Essex, Huntingdon (now Cambridge), Surrey and Sussex, but Berkshire, Cornwall, Dorset and Hampshire are represented (N.B. This is not the insect's full range). Many of such places are too small to be worth return visits, while many have been destroyed even in our short experience. Blackthorn is being rooted out by farmers, foresters and river board workers at an accelerating pace, the heaviest loss being in Manley's old stamping grounds. The only reasonably safe places are commons. Even such areas may be tidied up for the benefit of the public but to the detriment of *Acleris cristana*.

In the autumn of 1969 I decided to try to breed the moth. I knew that Sheldon had bred only the three common forms that he had used as parents. In the hope that cross pairings of moths from different areas might produce something more interesting, thirty-one *cristana* of eleven forms from Huntingdon, Surrey and Sussex were sleeved on blackthorn in a large pot and placed in the shade of an old pigsty wall late in October. Great pleasure was obtained from visiting the sleeve with a torch after dark throughout the winter. One preconceived notion that the moths would settle down into a quiet hibernation had to be abandoned, for different forms were visible on each visit. They were constantly on the move except when there was a frost; one was seen to shift its position when there was snow on the ground on the 14th February. Five days later the

first pairing was seen. In subsequent years pairing, which takes place more than once, went on from early February to April.

On the 20th April we cleared the sleeve, finding twenty-two moths alive. Fearing that the hatching larvae would possibly find nothing to eat, we removed the ova by cutting up the twigs, placing some in sleeves on our hedges while the rest were kept indoors. By the 8th May larvae in their second instar could be seen in the containers. We had better results from these than from those we had sleeved.

This small breeding trial gave good results with thirty forms. Of these, eight were of the parental kinds while twenty-two were different. Moreover there were rare forms among them, namely *xanthovittana* Desv., *fulvopunctana* Sheld. and *attaliana* Clark.

In the autumn of 1970 we were able to put together four sleeves, this time sexing the moths and using males from one county with females of another. Common forms were excluded. So good were the results that this has been our practice as far as possible ever since. Details of each year's efforts are not needed, they would take too long and be boring. However, some salient points may be mentioned. We had no stock from 1972 with a breeding blank the following year. In 1975 Alan bred one hundred and ten from a few Essex and Huntingdon moths he had scraped together in another useless season, that of 1974. As eight of these turned out to be the rare form *promerlana* Manley, he tried again with common forms caught in 1977, nothing else being available, but a point I want to make was emphasized, for not one good form was bred.

The data in tables 1 and 2 illustrate how one can breed large numbers of rare forms while at the same time the commoners are reduced in proportion. Table 1, about the rarities, could be extended, the examples chosen being the most extreme. Table 2 gives the commonest forms from our records of nine thousand caught and going on for seven thousand bred.

TABLE 1 The benefits of breeding *A. cristana*

The numbers of some rare forms (1) caught by us, (2) bred by us, (3) in the BMNH Collection, (4) in the Manley Collection.

	<i>caught</i>	<i>bred</i>	<i>BMNH</i>	<i>Manley</i>
<i>protolana</i>	0	27	0	2
<i>ruficristana</i>	0	25	0	1
<i>ruthana</i>	0	8	5	0
<i>clarkiana</i>	0	92	15	1
<i>subclarkiana</i>	1	57	6	0
<i>nigrocapucina</i>	1	67	9	10
<i>subtolana</i>	1	17	2	1
<i>subgumpinana</i>	1	52	4	6
<i>meyrickiana</i>	1	17	6	0
<i>masoniana</i>	5	72	19	7

I shall turn to our procedure each year. Desirable forms may be caught early in the season and as the moths will not live for more than about a fortnight in the refrigerator we set up county sleeves from which the breeding sleeves are made up later. The 1976 season gave us the chance to have five sleeves of choice forms. The autumn following the drought was very wet. We lost half our stock, the moths in the sleeves which were shut in by the others being the ones that perished. I am sure that they like a sheltered situation, but more air is needed in those sort

of conditions. The extra humidity of that winter may have been one cause of the sudden decline in numbers in the wild. Our survival rate is usually high, sometimes one hundred per cent. I seldom feed the moths before the new year and have never detected one imbibing, though they must do so.

Collecting the eggs takes a day or more depending on the number of sleeves. We usually go through them for the first time in late March nowadays, with one or two more collections later, the moths being put back with fresh twigs each time. Although they live till mid-May they cease to lay earlier.

The twigs with the ova are cut up and put in sandwich boxes with fresh bits of blackthorn on top. This is the only difficult time, but the larvae are active, moving readily to added food. Moreover they will stand a fair amount of squalor in their boxes which is fortunate as moving and counting them is time-consuming and they are often kept waiting. Last spring we took out over one thousand, six hundred ova from which were obtained over eleven hundred moths. Once the larvae are large enough to be counted there are few losses.

TABLE 2 The commonest forms 1968-1980

<i>Totals</i>	<i>caught</i>	<i>bred</i>
<i>nigrana</i>	1476	400
<i>striana</i>	1103	171
<i>spadiceana</i>	811	263
<i>semiustana</i>	775	107
<i>subunicolorana</i>	699	108
<i>brunneana</i>	585	214
<i>cristalana</i>	510	50
<i>subcristalana</i>	472	79

Pupation takes place in leaves neatly folded or in the tissue. I find that the pupae can be felt more easily than seen. They are all extracted from their cocoons, placed on peat and sprayed twice or thrice a day. In these artificial surroundings they emerge in three weeks. Very rarely are there exceptions to this. It follows that our moths are out early, the whole lot frequently before those in the wild have begun to emerge. However, Alan had one part of the 1979 set which appeared in late July and he kept these over the next winter. The results from these in 1980 were no more remarkable than from many of our normal efforts.

Our breeding stock for 1981 is a joke; six *cristana* with no potential. We must await patiently the year when we are able to collect together the right combination to produce something we have never seen, the four rare forms with the *semiustana* background.

THE DESCRIPTION OF THE NEW FORMS

I have given names to show, where possible, the relationship with existing forms. In some cases the obvious name had already been used making an alternative necessary. In two I have been pleased to perpetuate the tradition of using the names of collectors who have been closely associated with the moth.

The descriptions are in the order of the illustrations. I have tried to show where these forms fit into Manley's key, giving the group number (or a new one if needed) and the place in the group.

1. f. *palistriana* f. nov.

This is similar to f. *striana* Haworth, except for the buttons which are a fawn colour instead of black or very dark brown. The holotype was taken at Kirdford, Sussex on 21.viii.1976.

Follows *nigroinsulana* Manley in the key, needing a new group 2b as having the same background as the three preceding forms but a different button.

2. f. *proinsulana* f. nov.

This is exactly like f. *insulana* Curtis but is without the buttons. The holotype was bred in 1980 from an Essex and Huntingdon cross.

Should follow f. *subxanthovittana* f. nov. at the end of 1a.

3. f. *obscurana* f. nov.

Has the brown ground colour mottled with darker as f. *profunana* Fabricius but is without the buttons; it is distinct from the plain background of f. *unicolorana* Desvignes. The holotype and twelve paratypes were bred in 1972 from crosses between moths from Essex and Huntingdon, also Surrey and Sussex.

Follows f. *provittana* Desvignes in a new group 3b: ground colour as 3a, but no buttons.

4. f. *nigrosubcristalana* f. nov.

The ground colour is dark brown, the buttons black. This is a melanic version of *subcristalana* Curtis in the same way that f. *nigrocristalana* Manley is a melanic f. *cristalana* Donovan. The holotype was caught in Monks Wood on 22.viii.1971 and there are nine paratypes bred in 1974 from a Huntingdon-Surrey cross.

6b, described as having the same colour as 6a but without the white V.

5. f. *fordana* f. nov.

As f. *vittana* Stephens but without the buttons. The holotype was taken at Itchingwood (Surrey) ix.1943 by L. T. Ford and is in the British Museum (Natural History) collection.

In group 9a following f. *prochantana* Clark.

6. f. *inornana* f. nov.

This is a pale example of f. *spadiceana* Haworth but without any trace of the striated vitta which is always present in greater or lesser degree in that form. The holotype was caught at Loughton, Essex on 14.ix.1980.

In group 9b, before *spadiceana*.

7. f. *subochreanigrana* f. nov.

Exactly like f. *ochreanigrana* Manley but with a sub-vitta instead of one running the length of the dorsum. The holotype and one paratype were bred in 1979 from Essex moths crossed with some from Surrey and Sussex.

Before *ochreanigrana* in 10b.

8. f. *fulvopurdeyana* f. nov.

This is f. *purdeyana* Webb but it has a pale cream vitta instead of white. The holotype was bred in 1972 from a Huntingdon-Sussex cross.

In group 23b after *purdeyana*.

9. f. *prosubchantana* f. nov.

As f. *subchantana* Clark but there are only traces of scales instead of the buttons. The holotype was caught at Epsom, Surrey on 4.x.1975.

This comes in 9a between f. *vaughaniana* Webb and f. *prochantana* Clark.

10. f. *manleyana* f. nov.

A form like f. *satana* Manley but having a full white vitta instead of the sub-vitta of that form. The holotype and five paratypes were bred in 1977 from a Surrey and Sussex cross.

I cannot agree that f. *attaliana* Clark should be in the same group as *satana*. The new form should be placed in this, 14c.

11. f. *dualana* f. nov.

The area above a line drawn from the base through the disc to the apex of the forewings is blackish-purple while the lower part is a rich mahogany colour. There

are no buttons. The holotype and one paratype were bred in 1980 from a cross between moths from Huntingdon with some from Essex and Surrey.

This form fits nowhere in the Manley key.

12. *f. subxanthovittana* f. nov.

This form shows a combination of vitta markings not seen by us before. It is a *f. xanthovittana* Desvignes with a white sub-vitta superimposed on the yellow vitta. The fact that it was caught in Surrey from where *xanthovittana* has never been recorded is interesting. The holotype is from Epsom 9.viii.1976.

Follows *xanthovittana* in group 1a.

13. *f. ochreafulvana* f. nov.

Here is *f. fulvana* Sheldon with, additionally, a yellow vitta. The holotype is labelled New Forest 28.x.38 W. Fassnidge, and there is a paratype, New Forest ix.1891 S. Webb. Both are in the BM(NH) collection.

This follows *f. albofulvana* Manley in group 16a.

14. *f. nigrofulvana* f. nov.

These are melanic forms of *f. fulvana* Sheldon, or they could be regarded as *f. sericana* Hubner without the buttons. The holotype and two paratypes were bred in 1976 from Huntingdon moths crossed with ones from Surrey and Sussex.

This and the following form need a group setting up between 17 and 18.

15. *f. alisana* f. nov.

A melanic form of *f. albofulvana* Manley with the forewing ground colour black rather than brown exactly as in the last one. The holotype and six paratypes were bred in 1976 from a Huntingdon-Surrey cross; one from a Surrey-Sussex cross; three from a Huntingdon-Sussex cross; and three bred in 1977 from a Surrey-Sussex cross.

The following three forms are the completion of the *f. sericana* Hübner group and they would come after *f. flammeana* Webb in 17. The first one, with the sub-vitta is the specimen mentioned by Manley as being very dark and similar to *sericana*, but he did not name it. In view of the appearance of the others this seems the right time to do so.

16. *f. nigrocapitana* f. nov.

This is the melanic form of *f. albicapitana* Sheldon. The holotype is in the BM(NH) collection: Kirdford, Sussex 13.ix.1937 W. Rait-Smith.

17. *f. albosericana* f. nov.

Here we have the melanic form of *f. albiovittana* Stephens. The holotype and one paratype were bred in 1972 from a Surrey and Sussex cross; six paratypes bred in 1971 from Huntingdon moths crossed with Surrey and Sussex ones; two paratypes bred in 1976 from a Surrey and Sussex cross.

18. *f. fulvosericana* f. nov.

This is the melanic version of *f. fulvocristana* Stephens. The holotype and six paratypes were bred in 1972 from a Surrey and Sussex cross.

ACKNOWLEDGEMENTS

I wish to thank the following for making this paper possible:— The National Trust through Mr. H.W. Mackworth-Praed and the Nature Conservancy for permissions to collect; The Trustees of the British Museum (Natural History) for allowing me full access to the collections; Lt Col. W.B.L. Manley for his interest and encouragement; Mr D.C. Carter for photographic work; Mr R. Dyke for the beautiful paintings of the new forms.

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CORRESPONDENCE

Entomological conservation of Ministry of Defence land

As a direct result of the Report of the Defence Lands Committee 1971-73, chaired by Lord Nugent, the Ministry of Defence appointed a Conservation Officer, Lieut. Colonel C. N. Clayden, in 1975. During the first four years of office he has been instrumental in the setting up of nearly 150 local conservation groups on M.O.D. property ranging from Culdrose in Cornwall to Benbecula in the Outer Hebrides, from Lydd in Kent to Castlemartin in Dyfed. One of the objectives of these groups is to identify sites and habitats of special natural history interest on these areas so that they may be preserved, provided that this can be achieved without detriment to the primarily important military function of the area. Clearly before this can be accomplished, the Conservation Officer and the Conservation Group need to know which species of animals and plants occur on the area. As M.O.D. Adviser in Entomology it is one of my responsibilities to assist in collecting specimens and records of insects on M.O.D. land. I am only too well aware that to do this work properly could occupy a battalion of entomologists for at least a hundred years! We desperately need all the help we can get, from both amateur and professional entomologists, first of all in collecting specimens, and perhaps more important in identifying them to species. In return we can offer the opportunity to spend pleasant days collecting in some of the most attractive parts of the country which under normal circumstances are rarely visited by members of the public. It may also be possible to become a specialist member of the local M.O.D. conservation group. If any of your Members are willing to help in this venture by collecting and/or identifying specimens, I should be most grateful if they would contact me at the address above. They may have a particular entomological interest in an area of M.O.D. land near where they live, but I would ask you to remind them that for their own safety they must obtain, through me at the address above, the agreement of the Commanding Officer of the site in question and the M.O.D. Conservation Officer before visiting the area. Your help and that of your Members would be very much appreciated.

N.R.H. Burgess, B.Sc., Ph.D., F.R.E.S., M.I.Biol., Royal Army Medical College, Millbank, London, SW1.

OBSERVATIONS ON THE SCARCE SWALLOWTAIL
***IPHICLIDES PODALIRIUS* (L.) (LEP: PAPILIONIDAE)**

by JOHN FELTWELL

Henley Down, Catsfield, East Sussex, TN33 9BN.

The Scarce Swallowtail (*Iphiclides podalirius* (L.)) is the most common of the four papilionids present in the Cévennes mountains of France (Feltwell, 1981) and as such makes excellent living material to study. It has a widespread distribution in the south of France but is not now represented in Britain; there being some doubtful evidence of it being here in the early eighteenth century (Ford, 1945). It is a very occasional vagrant to Britain and it has been said that it could possibly survive in the south of Britain (Bretherton *in* Dennis, 1977). It has been estimated that *podalirius* is about 50 times more common than its relative the Swallowtail (*Papilio machaon* L.) in France (Feltwell & Burton, 1981) and it is certainly a misnomer of its English name to call *podalirius* 'Scarce'. When in the Cévennes the English names of these two butterflies should be reversed.

Details are given here of observations on habitats, nectar sources, floret feeding, resting, daily flight period, roosting site, territorial behaviour, age and predator protection studied over the last few years on several visits to the Cévennes.

HABITATS

The Scarce Swallowtail is found in many situations from market places, back gardens, on wild limestone causses and in the perpetual green and thorny garrigue in the lowland as well as in the mountains wherever there is an abundance of wild flowers, water and Sloe (*Prunus spinosa* L.). Higgins and Riley state that it is found up to 6000 feet (1829 m).

Reinhold's (1977) study of *I. podalirius* in one of its few German localities (Radebeul slopes in D.D.R.) states that the habitat consisted of Sloe, Midland Hawthorn (*Crataegus oxyacanthoides* Thuill.), Wild Rose (*Rosa* sp.), Bramble (*Rubus* sp.), Broom (*Cytisus scoparius* (L.)) and another *Prunus* species.

Sloe grows very readily in the Cévennes on both limestone, micaschist and alluvial deposits. In places where there is a lot of grazing the sloe bushes assume a very prostrate position and rarely reach above 50 cm from the ground.

The association of *podalirius* with man is worth stressing as the butterfly often appears to be more abundant around villages and hamlets than in the countryside. This is because the butterfly is reputed to lay its eggs on cultivated fruit trees. Apple (*Malus* sp.), Cherry (*Prunus* sp.) Peach (*Prunus persica* (D.) Batsch) and Olive (*Olea europaea* L.) are principally grown in the Cévennes. The hamlet habitat is a much more open type of habitat than the countryside and the butterfly can be seen readily patrolling the areas between houses, trees and other easily identified landmarks in the human environment. Where grazing is absent in the hamlet habitat the wild sloe bushes then grow up to a considerable size.

NECTAR SOURCES

If *podalirius* is studied over a considerable time it will become clear that it imbibes nectar from a variety of wild flowers but it has a particular penchant for Lesser Calamint, on which, if it is present, it will be found almost exclusively. The first four species in the following list have been listed in decreasing order of frequency of visiting as far as can be ascertained.

<i>Specific name</i>	<i>English name</i>	<i>Colour of flower</i>
1. <i>Calamintha nepeta</i> (L.) Savi	Lesser Calamint	White-lilac
2. <i>Origanum vulgare</i> L.	Marjoram	Rose-purple
3. <i>Onopordum acanthium</i> L.	Cotton Thistle	Reddish
4. <i>Knautia arvensis</i> (L.) Coult.	Field Scabious	Pink

Occasionally visited (not in order of visiting)

<i>Clinopodium vulgare</i> L.	Wild Basil	Rose-purple
<i>Echium lycopsis</i> L.	Purple Viper's Bugloss	Red-purple
<i>Echium vulgare</i> L.	Viper's Bugloss	Blue
<i>Mentha longifolia</i> (L.) Huds.	Horse-mint	Lilac

Attracted to the flowers of, but refused at close quarters

<i>Daucus carota</i> L.	Wild Carrot	White
<i>Convolvulus althaeoides</i> L.	Mallow-leaved Bindweed	Pink

In the spring *podalirius* can be seen visiting the blossoms of Cherry and in gardens it will also visit yellow asters and blue petunias. As flowering plants yield nectar at different temperatures and at different times of development of the flower, this probably influences the selection of the nectar-source as in honeybees. Colour preference may exist in the imago and change with age as in the Large White butterfly (*Pieris brassicae* (L.)) but this was not tested here. It is noticeable from the list of flowers visited that *podalirius* visits particularly those coloured pinkish to purple. White to lilac, in the form of Calamint, is preferred even when there is a choice, whilst bright red and yellow are conspicuously absent.

FEEDING

Several individuals were followed for as long as possible and notes taken of their behaviour. Termination usually occurred when the insects flew off suddenly or were involved in forays with other adjacent *podalirius* when it was difficult to keep track of the original butterfly. The choice of a *podalirius* with a broken 'tail' was often a useful ploy.

The longest time one butterfly was followed whilst feeding was 64 minutes during which time the fresh female only moved around in an area about 10 m² feeding exclusively on Lesser Calamint. During this time it imbibed nectar from 684 florets on 223 separate flower spikes and only rested (apparently doing nothing) for 2 minutes, i.e. 3.2% of the time.

When feeding the butterflies always work up the flower spike from the bottom and then fly on to another spike. Characteristically there is a very obvious pumping action of the head and proboscis whilst feeding as if the insect is having difficulty getting its proboscis down the tubular floret. The movement is independent of the body which is held still while the butterfly vibrates the wings. The legs only touch the spike very delicately during feeding while the wings keep the insect partially airborne.

RESTING

Some of the *podalirius* followed will spend as much as 50% of the time resting on trees such as Olive and Lime (*Tilia* sp.) while others will settle on large stands of wild oats which provide vantage points over the surrounding vegetation. After following numerous butterflies one is left with the impression that rest is a physiological necessity; the butterflies may have to wait while their bodies

metabolise the recently-imbibed sugary nectar into flight energy. There are periods in the day, particularly afternoons, when there appears to be more resting than flying activity as the next section demonstrates.

DAILY FLIGHT PERIOD

I. podalirius appeared to be on the wing most between 11.00 h and 14.00 h when the temperature ranged from 31.42°C (Table 1). The maximum number of butterflies seen at any one time on these occasions was 12 over the one hectare area scanned, but it was the casual observation of 19 on two successive days when the temperature was over 49°C that drew attention to the necessity for hourly counts. The table shows that there is a noticeable drop off after 14.00 h although the temperature stayed fairly high, e.g. above 32-36°C from 12.00 h to 17.00 h on the 20th August, or when the temperature went higher as on the 22nd.

TABLE I Numbers of *I. podalirius* seen in August over a one hectare area of hamlet habitat at hourly intervals throughout the day, compared with hourly temperatures.

DATE	TIME hrs.	09	10	11	12	13	14	15	16	17	18	19	20
16th	Temp. °C	21.5	26.5	33	33.5	40							
	Nos.	0	1	4	10	6							
19th	Temp. °C	21	29	31	32	32	27	26.5	25.5	25.5			
	Nos.	0	0	9	12	4	3	3	1	1			
20th	Temp. °C	23.5	25	31	35	35.5	35	32	36	32	30.5	28.5	25.5
	Nos.	0	0	1	4	6	2	3	3	2	1	1	0
21st.	Temp. °C	18	27	33.5	35.5	35	36.5	42	42				
	Nos.	0	0	2	0	3	5	4	4				
22nd	Temp. °C	22	30	32	41	41.5	41.5	41.5					
	Nos.	0	0	1	1	0	0	2					

Information on fall-off of butterfly populations can be obtained from inspection of hourly counts over a series of days. If the sum of the numbers of butterflies seen between 11.00 h and 13.00 h inclusive is compared over the five days the figures show a decline, viz. 24, 15, 11, 5, 2. It was clear from the 22nd August that the number of individuals was dropping off.

ROOSTING SITE

Following publication of Garton and Rothschild's (1977) paper on the roosting sites of four species of swallowtail in Florida, I was curious to know and compare what happened to *I. podalirius*. Imagines of *podalirius* were followed towards sunset and visited in the early morning during August 1979 and 1980.

The only plant that *podalirius* was ever found on or followed to was Olive and the butterflies always chose the top of the tree or the tip of a lateral branch close to the top. On most occasions their wings, when spread, faced west and they typically opened their wings to benefit from the last rays of the sun. This is similar to *Papilio cressphontes* Cramer. Only one *I. podalirius* was ever seen roosting on the east side of the trees.

Roosting with wings to the west puts the butterfly at a disadvantage when the sun rises in the east and some degree of movement does take place so as to align the wings sideways onto the early morning sun, but not always. Garton and

Rothschild mention that *Papilio palamedes* Drury extends its wings in the direction of the early sun.

One butterfly went to the top branch of an olive tree at 19.10 h on the west side, remained motionless with wings opened for 14 minutes, then closed them suddenly. In the morning at 07.00 h it was still there but now aligned north-south. The sun's rays caught the undersides of the wings side-on at 08.10 h and the butterfly stayed motionless until 08.28 h when it aligned itself east-west and then over a period of four minutes slowly opened its wings until at right angles to the sun. It moved off suddenly at 08.55 h giving a roosting time of almost 14 hours. Bumble bees, dragonflies and syrphids had been up since before 08.00 hours.

Another individual which was aligned to the west opened its wings at 09.30 h when the temperature had reached 24°C, at 09.40 h it moved its legs and at 09.41 h it flew off, the temperature having risen dramatically to 33°C.

Another individual opened its wings at 09.45 h and turned slightly when the temperature was 29.5°C. At 09.52 h its antennae moved and at 10.00 h it flew off at 36°C.

The butterflies obviously wait for the sunshine to strike them before flying off and this may be two hours later in the morning if they have gone to rest on the west side of a mountain, than on the east side.

TERRITORIAL BEHAVIOUR

It is clear that *I. podalirius* patrols particular patches of land in the same way that the Painted Lady (*Vanessa cardui* (L.)) or the Speckled Wood (*Pararge aegeria* (L.)) come back to the same places. No quantitative evidence has been accumulated on this yet, but many hours of observation have been made looking down from a first floor terrace onto areas where many *podalirius* patrol.

Certain points are clear though. The patrolling is almost invariably done singly and for long periods up and down the sides of buildings (in the hamlet habitat) pausing occasionally to rest on prominent heads of Wild Oat (*Avena fatua* L.) or adjacent bushes. A 'long period' might mean a whole day and one would be conscious of the same butterfly patrolling the same beat all day long. An essential component of the patrolling is a gliding phase when the butterfly will make perhaps one flap at each end of 10 m path. If another *podalirius* enters this arena great chases ensue, when it is virtually impossible to see what is going on, especially when groups of four or five *podalirius* go careering around buildings, trees and bushes.

AGE

Two methods of marking were tried; first with numbered self-adhesive fluorescent pink spots (sold by Ryman's). Altogether 68 specimens were marked and the longest return was 12-27th August or 15 days. Numbers could be read off the butterflies while they were feeding without catching them.

The second method was using car spray (Renault-red), which, with prior practice on leaves could be aimed correctly with a light spray onto particular wings and surfaces. This method does have the advantage that the insect does not have to be caught and handled and the insects can be easily detected at long range. If used very delicately this technique is invaluable as the spray dries within seconds on the wing. The red-sprayed butterflies seemed at no disadvantage mixing amongst their own population.

PREDATOR PROTECTION

Any observation on *I. podalirius* would not be complete without mention of its 'tails' and its appearance of flying backwards.

I. podalirius is the largest and most obvious butterfly around houses in the Cévennes and is frequently seen by people who naturally comment about it. It is a curious point that people will invariably exclaim that the butterfly is quite extraordinary as it appears to be flying backwards. The reason is that the large 'tails' look like antennae and point backwards while the butterfly itself flies in the other direction. This deception is especially evident when the butterfly is gliding.

Is there any significance in this observation that man is deceived of the proper end for the head? Is it possible that bird and reptile predators are similarly deceived? If so then there may be a case for this system evolving as a unique predator-protection strategy and would provide an explanation of the swallowtail's 'tails'. Not only are the 'tails' mimicking the antennae but the dark termen spot on the inner margin of the hindwing may be mimicking the head and compound eyes (see fig. 1). This explanation is offered merely as an attempt to resolve the recurring observations that the butterfly flies backwards. Any comments and observations would be welcomed.

SUMMARY

Studies on *I. podalirius* in the Cévennes have shown that feeding imagines prefer the flowers of Lesser Calamint (*Calamintha nepeta* (L.) Savi) when this is available. Other nectar sources are given. The imagines can be very active feeders and one was recorded to insert its proboscis into over 650 florets on over 200 flower spikes during one hour. Observation has also shown that there appears to be a peak of flight activity at about midday. Hourly counts over a defined area over several days also give information on the fall-off of overall butterfly populations. Roosting of imagines in Olive trees is described. Information from marking experiments shows that imagines can live for up to 15 days. Details of territorial behaviour are given and the significance of the tails in predator-prey relationships is discussed.



Fig 1 *I. podalirius* feeding on Flat-Topped Carline Thistle (*Carlina corymbosa*). Note how the antennae and 'tails' are aligned in opposite directions, and how the dark spot on the inner margin (termen) apparently emphasises the head and compound eyes.

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BOOK REVIEWS

Rearing and Studying the Praying Mantids by G.L. Heath. Amateur Entomologists' Society Leaflet no. 36, 1980. 15 pp. incl. 4 pp. half-tones. £1.50.

This is a readable account of the author's methods of rearing mantids in Britain, if not exactly in captivity. The lax attitude to escape may be harmless in a largely tropical group of predatory insects, but it should certainly not be commended in print to people who will probably give equally little thought to rearing far less innocuous pets.

The information could have been presented more concisely, which would have left space for such absent items as a list of further reading. There is nothing to justify "studying" in the title.

The editor does not understand the proper use of the term "plate", and the gaff on page 5 could surely not have occurred had a proof-reader been used.

R.U.

Provisional Atlas of the Arachnida of the British Isles, Part 1 Pseudoscorpiones.

Edited by Philip F. Jones. Biological Records Centre, 1980. Introduction 3 pp, 26 distribution maps. £2.00

Pseudoscorpions are attractive creatures but as they are all small, rarely exceeding 5 mm in length and have little, if any, economic significance, they have not been much studied. Philip Jones is to be congratulated on gathering together so much information, even though, as he points out, the maps are apt to give the distribution of the collectors rather than the pseudoscorpions.

In some of the maps a slight blotchiness in the Orkney and Shetland Isles could cause confusion. However, a glance at Map 1 (records received) makes it clear that no pseudoscorpion records whatever have been received from those islands. It is a good idea to read the errata slip and note that the captions for maps 3 and 5 have been transposed. Otherwise the maps are clear and well printed. The habitat notes are helpful and concise.

The introduction summarises the present position and the past history of the study of pseudoscorpions in Britain (with a useful list of references) and offers help to any adventurous naturalist wishing to take up the subject. It is clear from the Atlas that this is absolutely the right time to do so.

F.M. Murphy

**A FORMER NORTHAMPTONSHIRE LOCALITY FOR THE
CHEQUERED SKIPPER BUTTERFLY,
CARTEROCEPHALUS PALAEMON (PALLAS)**

by T. S. ROBERTSON

(43 Locks Ride, Ascot, Berks., SL5 8DQ)

INTRODUCTION

From having formerly had a widespread distribution in a diagonal belt of country lying in a south-west to north-east direction across southern England, the Chequered Skipper butterfly, *Carterocephalus palaemon* (Pallas), retreated in a north-easterly direction, and apparently became extinct in England in about the mid-nineteen-seventies (Goodden, 1978; Ratcliffe, 1979; Robertson, 1981). It survives in Scotland. During about the same period as *C. palaemon* retreated north-eastwards, the Large Blue butterfly, *Maculinea arion* (Linnaeus), which had shared a somewhat similar distribution, retreated south-westwards to become extinct at about the same time (Ratcliffe, 1979; Thomas, 1980; Robertson, 1981).

The reasons for the decline of the Large Blue have been well documented (Thomas, 1980) but those for the decline of the Chequered Skipper remain unknown, although it has been suggested that climatic changes and the cessation of coppice management of its woodland habitats may have contributed (Robertson, 1981).

A group of woods near Desborough, Northamptonshire, was the last remnant of Rockingham Forest (the former stronghold of *C. palaemon* in England) to be actively coppiced (Peterken and Harding, 1974), and *C. palaemon* was plentiful in this entomologically comparatively little-known habitat in the nineteen-fifties and early nineteen-sixties. For this reason, a brief account of the entomology of the woods and surrounding area has been prepared, in the hope that it may be of value in identifying suitable habitats from indicator species, if *C. palaemon* should be rediscovered or reintroduced.

THE NATURE AND LOCATION OF THE GROUP OF WOODS
NEAR DESBOROUGH

The complex of woods, as shown in Fig. 1, lies in an area of about 1½ miles square to the north of Desborough and about 3 miles to the east of the boundary of Northamptonshire with Leicestershire near Market Harborough. It marks almost the extreme edge of Rockingham Forest (which is a collection of woods and not a continuous tract), abutting to the north-west on the Leicestershire landscape of mainly grazing land with scattered fox coverts, and leading to the north-east towards the predominantly limestone habitats of Rutland, Northamptonshire and Lincolnshire which are (or were) the haunts of such chalk-loving species as the Chalk-hill Blue (*Lysandra coridon* (Poda)), the Brown Argus (*Aricia agestis* (Denis and Schiffermüller)), the Orange-Tailed Clearwing moth (*Conopia anthraciniformis* (Esper)) and the Bloody-Nosed beetle (*Timarcha tenebricosa* (Fabricius)).

The group comprises Brampton Wood (now cleared and replanted with conifers, and not to be confused with a well-known wood of the same name in Huntingdonshire) and the contiguous Stoke Wood, and (a few hundred yards away to the east) Bowd Lane Wood and Walter Wood. The latter three woods were managed as oak standards with hazel coppice at least until the late nineteen-sixties, and along with woods still further to the east (Pipewell Wood, Monks

Arbour Wood and Carlton Purlieus) led to the better known distribution area of *C. palaemon*.

Brampton Wood apparently represented the limit of the range of *C. palaemon* in the nineteen-fifties, as the butterfly was undetected in Hermitage Wood (about 400 yards to the west and apparently suitable as a habitat) nor at Waterloo Covert (now eradicated and converted to farmland), Dingley Wood or Dingley Warren, which abuts against the Leicestershire border. A stray specimen (now in the Leicestershire Museums) was taken by the late H. A. Buckler on railway land at Marefield in Leicestershire in about 1941 (personal communication).

To the south and east of the group of woods under discussion there lay an extensive area of several square miles of long-abandoned ironstone workings, which formed a veritable nature reserve for many interesting plants, insects and birds, but this area was levelled and reclaimed as agricultural land in the nineteen-fifties, much to the detriment of wildlife in the area.

THE BOTANICAL NATURE OF THE WOODLANDS

The botany of Rockingham Forest has been described and discussed by Peterken (1974, 1976) and Peterken and Harding (1974, 1975). All the woods referred to in the present study have been wooded since mediaeval times, and some have long been regarded as important for nature conservation. Peterken (1974) listed indicator species of plants for primary woodland, and many of these were present in the Desborough woods.

Brampton Wood had been cleared in the nineteen-forties, and by the nineteen-fifties (when it was largely unmanaged) had regenerated with a low-grade mixture of oak, hazel, ash and conifers, with ancient sallows in a damp hollow at its remote northern end (a possible potential breeding site for the Purple Emperor butterfly (*Apatura iris* (Linnaeus))). It was cleared in sections and planted with conifers in the nineteen-fifties and nineteen-sixties. Before it was cleared, the ground flora in spring included abundant spreads of violet (*Viola* spp.), wood anemone (*Anemone nemorosa*), dog's mercury (*Mercurialis perennis*), bluebell (*Endymion nonscriptus*) and some primrose (*Primula vulgaris*). The rides were bordered with clumps of bush vetch (*Vicia sepium*) and carried patches of bugle (*Ajuga reptans*). In summer, characteristic flowers of entomological interest included honeysuckle (*Lonicera periclymenum*), hogweed (*Heracleum sphondylium*) and bramble (*Rubus*).

The coppiced woods (Stoke, Bowd Lane and Walter) tended to have a succession that followed the coppice programme, similar in floral composition to that of the rides of Brampton Wood, but with large areas of primrose, violet and wild strawberry (*Fragaria vesca*) in newly coppiced sections, dense honeysuckle in some older sections, and a sparse ground cover in the oldest coppice growth. The rides were kept more clear of encroaching scrub than in the unmanaged Brampton Wood.

SOME CHARACTERISTIC INSECTS OF THE WOODS AND ADJACENT COUNTRY

In the nineteen-fifties, the area generally had received little attention from entomologists, who tended to go to the better-known localities. Nevertheless, it was rich in the more conspicuous Lepidoptera and Coleoptera. The cardinal beetle *Pyrochroa serraticornis* (Scopoli) was plentiful in woods throughout the area. The rare longhorn beetle *Agapanthia villosa viridescens* (De Geer) occurred freely (mainly on the stems of hogweed) in the woods and at roadsides; and the commoner longhorns *Grammoptera ruficornis* (Fabricius), *Rhagium bifasciatum* (Fabricius), *Stenocorus meridianus* (Linnaeus) and *Strangalia maculata* (Poda) flew actively by day, visiting flowers of hogweed, wild rose and hawthorn in their

appropriate seasons. Waterloo Covert harboured the spruce longhorn (*Molorchus minor* (Linnaeus)), the musk beetle (*Aromia moschata* (Linnaeus)) and the weevil *Cryptorhynchus lapathi* (Linnaeus), the latter two species tunnelling as larvae in the old willows growing in this rather damp woodland. The wasp beetle (*Clytus arietis* (Linnaeus)), a longhorn beetle that mimics a wasp in its behaviour and appearance, was plentiful in the area. The commonest hedgerow tree is ash, and a rare bizarre beetle often found on the fungus *Daldinia concentrica* on dead ash trees in sunny weather was *Platyrhinus resinosus* (Scopoli). It bears a strong protective resemblance to a piece of dead twig.

In addition to all the usual common woodland butterflies, the White Admiral (*Ladoga camilla* (Linnaeus)) was common in Brampton Wood, being seen occasionally feeding at dead rabbit carcasses on the ground. The Silver-Washed Fritillary (*Argynnis paphia* (Linnaeus)) was seen infrequently in Brampton Wood, and the Pearl-Bordered Fritillary (*Boloria euphrosyne* (Linnaeus)) was plentiful, especially in Stoke Wood. The Duke of Burgundy (*Hamearis lucina* (Linnaeus)) was seen once in Stoke Wood, as was the Green Hairstreak (*Callophrys rubi* (Linnaeus)). The Black Hairstreak (*Strymonidia pruni* (Linnaeus)) was seen at Dingley Warren on several occasions and the immigrant Humming-Bird Hawk-moth (*Macroglossum stellatarum* (Linnaeus)) was seen at the same locality on one occasion.

Dragonflies seen in Brampton Wood included *Libellula depressa* (Linnaeus), *L. quadrimaculata* (Linnaeus) and *Pyrrhosoma nymphula* (Sulzer).

SOME OBSERVATIONS ON THE CHEQUERED SKIPPER

In 1952 and 1953, *C. palaemon* was seen from about 14th May to about 18th June, its flight period ending shortly after that of the Large Skipper (*Ochlodes venata* (Bremer and Grey)) began. An albino Chequered Skipper (ab. *albinotica* Goodson) was taken in Brampton Wood on 21st May 1952 (Robertson, 1952; Goodson, 1960; Howarth, 1973); this specimen is now in the British Museum (Natural History).

Although most authors write of the Chequered Skipper visiting the flowers of bugle, I rarely saw them do so near Desborough, and the butterflies were nearly always found visiting the flowers of bush vetch. During a visit to Bowd Lane Wood in 1953 Clifford Holt obtained a short ciné-film sequence of *C. palaemon* in the field, and this historic piece of natural history film is still in his possession. It also contains a sequence of the Grizzled Skipper (*Pyrgus malvae* (Linnaeus)) shot during the same visit.

On any visit during the peak of the flying season, one could expect to see two or three Chequered Skippers on each section of sunlit ride in the complex of woods. It was estimated from observations on the ground and a study of the map (Fig. 1) that there were 30 sections of suitable ride, so about 75 butterflies would be seen. Since no butterflies were seen other than along the rides in the woods (although in some localities such as Wakerley, Northants., they did occur more widely), this should be a good estimate of the total numbers flying. Taking the rule-of-thumb estimate of one-third of the total emergence being present at the peak, this would indicate a total emergence of 225 butterflies, or about 25-30 males and the same number of females in each of the four woods. Allowing for the fact that some butterflies might be overlooked because they were resting, the numbers might be twice as high as this, but probably not more.

THE DECLINE OF THE CHEQUERED SKIPPER IN ENGLAND

On my latest visit to Bowd Lane Wood in the middle nineteen-sixties, the habitat appeared unchanged but *C. palaemon* was not seen. Brampton Wood had apparently become unfavourable a few years earlier, having been planted with

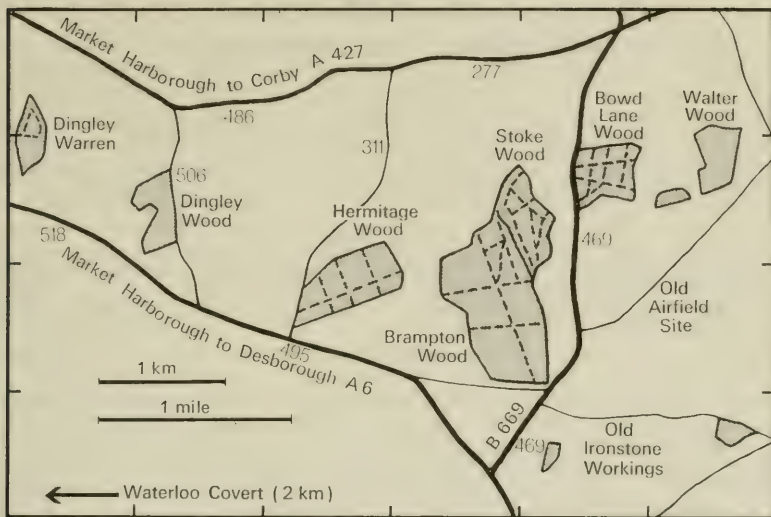


Fig. 1 A group of woods that include a former habitat for the Chequered Skipper butterfly, *Carterocephalus palaemon* (Pallas) (based on Ordnance Survey maps of the area). The National Grid reference of the bottom left-hand corner of the map is 42/760840, and the 1-km squares of the National Grid are shown.

conifers, although the rides were not too grossly altered. *C. palaemon* was still present, but in low numbers, in the traditional localities of Bedford Purlieus and Castor Hanglands (L. D. Young, personal communication). It disappeared from Bedford Purlieus in about 1971 (Heath, 1975).

The decline of *C. palaemon* until its apparent extinction in England has been reviewed in another paper (Robertson, 1981), two processes having apparently contributed. One was a long-term north-easterly contraction of range, possibly as a result of climatic changes; and the other was a series of changes in the habitat of Rockingham Forest described by Peterken and Harding (1974). Some of the requirements of *C. palaemon* have been discussed by Collier (1966). Thomas (personal communication) considers that the cessation of coppice management alone could not account for the final disappearance of the butterfly in England. The decline can hardly be attributed to collecting, because it seems to have been too general and prolonged and the species is not greatly subjected to collecting pressure. Localities such as the Desborough woods would probably be re-colonised in time if there was a natural expansion of range, provided they remained unchanged and there was a sufficiently strong nucleus in some refuge to maintain the population. This no longer seems likely, however.

There would seem to be little point in attempting to reintroduce the species from Scotland or continental Europe, as the English race had probably evolved a close physiological adaptation to its restricted habitats. Nevertheless, it would still seem worth while to try to retain some of the old Rockingham Forest in its past condition in case the Chequered Skipper should be rediscovered there.

ACKNOWLEDGEMENTS

George Peterken of the Nature Conservancy Council and John Heath and Jeremy Thomas of the Institute of Terrestrial Ecology kindly read the first draft of this article and made valuable suggestions as a result of which the text was modified and some additional material was incorporated. Clifford Holt of Leicester confirmed that his ciné film of the Chequered Skipper was still in existence and allowed me to refer to it. My friend Les Young gave me information on the status of the butterfly from his observations in the nineteen-sixties.

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Larval development in the abdomen of non-parthenogenetic Lepidoptera. — The familiar instances of larvae hatching within the abdomen of the parent in Lepidoptera are in parthenogenetic Psychidae. In Coleophoridae, the presence of many head capsules within the abdomen of specimens of *Coleophora leucapennella* (Hübner) used for genitalia preparations leads to a presumption of viviparity or ova-viviparity in a moth with normal fertilisation. What adaptation has enabled these eggs to be fertilised internally?

I have just mounted two female *Coleophora albicosta* (Haw.) and found both to contain a single larva, stretched out and not within its egg, located near the tip of the abdominal cavity. One larva was sufficiently sclerotised to have completely withstood the potassium hydroxide treatment. In the first case the abdomen contained few remains of eggs and I supposed that the moth had ceased laying with one fertilised egg remaining at the base of its oviduct. The second moth had more eggs left, but none had developed.

Have other readers had similar experiences with this or other Lepidoptera? — R. W. J. Uffen.

ALL FEMALE BROODS IN *PHILUDORIA POTATORIA* (L.) (LEPIDOPTERA: LASIOCAMPIDAE)

by M. E. N. MAJERUS

(Department of Biological Sciences, University of Keele)

In April 1972, 27 larvae of the moth *Philudoria potatoria* (L.) were taken from a small patch of grassland on Northwood golf course (N.G.C.). The area of grassland where these were taken was no more than 20 m \times 30 m, and other similar sites in the area had in the past and have subsequently yielded many larvae of this species. South (1961) reports that the female of this species lays her eggs in small clusters, usually on stems of grass but sometimes on other herbage. It is therefore possible that the larvae taken on this small patch of grassland were the progeny of only one or two females.

Initially nothing seemed to be extraordinary about these larvae; however, when the larvae pupated and emerged in July 1972, they produced a most unusual sex-ratio. When the first pupae hatched out there was no reason to suppose that a biased sex-ratio would result, and as I had previously bred this species on several occasions I released the first 13 imagines to emerge. All these were females. Obviously by this stage I began to become suspicious of the plethora of females. The first theory which occurred to me to explain this bias in the sex-ratio was that the females were emerging earlier than the males, and that the majority of the remaining twelve pupae would produce males. However, my previous observations on this species had never produced any evidence to suggest that females emerge before males. Indeed, such a situation would be in direct contrast to the usual situation in the Lepidoptera in which males generally emerge before females. In the event, eleven of the last twelve pupae to hatch were also females giving a total of 24 female imagines and only one male, (two larvae failed to pupate). The probability of obtaining a sex-ratio such as this in a random sample is less than 0.001 (chi squared = 19.56).

One possible explanation for the bias towards females is that male larvae pupate before female larvae, so that when the sample in question was collected, the majority of male larvae present on the grassland plot had already spun-up their cocoons. This seemed rather unlikely as the larvae were all collected before the 24th April, and in previous years larvae of this species had often been collected well into May without the ensuing imagines being predominantly females. Moreover, the majority of larvae collected were in the penultimate instar, and it is unlikely that male larvae would have pupated before the females had even reached the final instar.

As no obvious reason for the surplus of females in this sample suggested itself to me, I determined to attempt to breed from the imagines resulting from the latter twelve pupae.

Using the one male which emerged as a parent for two broods, and using five males taken at light in my garden in Northwood, Middx., seven of the eleven remaining N.G.C. females mated successfully and produced fertile eggs. The other four unmated females were also retained to see whether thelytokous parthenogenesis could be the cause of the excess of females. All four of these unmated females laid some eggs, but none of these hatched. Indeed, they failed to develop at all and within two or three days of being laid they began to shrivel and collapse. One additional female, taken at light in my garden in July also laid eggs, and as it was almost certain that she had a different origin to that of the other females, her brood was reared as a control. Consequently a total of eight broods were reared. The broods were carefully segregated, but all were kept under similar conditions. They produced imagines in June and July 1973.

The relevant details of these broods are given in Table 1.

TABLE 1
Number of Males and Females Produced in Eight Broods of *Philudoria potatoria*

Brood Number	Origin of Female	Origin of Male	No. of Ova Laid	No. of Ova Hatched	Females	Males	Resulting Imagines	Total	% Mortality of Eggs Laid
1	N.G.C. (ex-larva)	N.G.C. (ex-larva)	186	179	127	0		127	31.7
2	N.G.C. (ex-larva)	N.G.C. (ex-larva)	293	274	99	98		197	32.8
3	N.G.C. (ex-larva)	taken at light	97	91	31	46		77	20.6
4	N.G.C. (ex-larva)	taken at light	189	183	62	62		124	34.4
5	N.G.C. (ex-larva)	taken at light	233	212	170	0		170	27.0
6	N.G.C. (ex-larva)	taken at light	152	148	62	43		105	30.9
7	N.G.C. (ex-larva)	taken at light	129	120	85	0		85	34.1
8	taken at light	taken at light	162	149	60	58		118	27.2

A further 16 broods were obtained from matings between the progeny of these broods, but, due to an oversight on my part, all the resulting larvae died whilst in a colleague's care during April 1974 while I was abroad. This incident was unfortunate as the stock was intended for use in karyological experiments to determine the reasons for the abnormal sex-ratio.

As can be seen from the results of brood 1 in which both parents were from N.G.C. larvae only female progeny were produced, whilst in brood 2, where again both parents were from N.G.C., approximately equal numbers of male and females resulted. In two of the five broods in which the female parents were from N.G.C. larvae and the males were taken as adults at light, all progeny were females, whilst in the other three broods, approximately equal numbers of males and females resulted. Brood 8, which arose from a light-trapped female, produced progeny in the normal 1:1 sex-ratio.

DISCUSSION

We must now look for an explanation of these results. A number of theories have been put forward on different occasions to explain the occurrence of unisexual broods. In general such explanations can only be tentative unless supported by a thorough genetic and karyological investigation.

One of the most common explanations is that a lethal gene destroys one sex preferentially. However, as Robinson (1971) points out, except as an isolated and trivial event, it is difficult to conceive how such genes can fail to eliminate themselves. Such genes could only be maintained in a population for any period of time if they conferred an advantage upon the female carriers and were thus part of a balanced polymorphism.

Simmonds (1923a,b, 1926, 1928, 1930) has bred many families of *Hypolimnnae bolina* (L.) consisting of females only, obtaining his eggs from wild females captured in the Fiji islands of Viti Levu, Kandavu, and Vanna Levu, where a great excess of females has been noted since 1882 and was probably present long before this date. In the other islands and throughout the rest of its range the two sexes are found in approximately equal numbers. Simmonds pointed out that the percentage of fertile eggs is much lower in unisexual families than in bisexual families, and that some eggs change colour but fail to hatch, while others never change colour at all. In one case about one-third of the eggs hatched, and of the remainder half developed but did not hatch and half never developed at all. Cockayne (1938) notes Ford's suggestion that there is a sex-limited lethal gene which kills the male eggs. Robinson (1971) also postulates this explanation, but stresses that further investigation, especially into the cytology, is needed before this hypothesis can be verified or disproved. Goldschmidt (1934) had found a dominant gene, which kills all or almost all males of *Lymantria dispar* Linn. of a particular genetic constitution. If one or both parents are homozygous for this gene, all female families, or families with only an occasional male are produced. If both parents are heterozygous for it, the ratio is four females to one male, and if only one parent is heterozygous then the ratio is two females to one male. Other abnormal sex-ratios are produced if there is variation in the susceptibility of males to the gene's action.

The possibility of a sex-limited lethal gene causing the unisexual broods in *P. potatoia* is deemed unlikely as this hypothesis suggests that equal numbers of male and female eggs would be produced, but only the female progeny would survive to reach the imaginal state. Consideration of the number of eggs laid in the broods in question shows that the percentage of ova laid which survived to the adult stage is in general no smaller in the unisexual broods than in those producing a one to one sex ratio, and in every case is over 50 per cent. On the other hand such an hypothesis can not be ruled out completely as it is feasible that the action of a sex-linked lethal may be to cause the breakdown and re-absorption of those

eggs carrying two X-chromosomes* (and thus destined to be male) after fertilisation of the ovum by the spermatozoon and before egg laying, whilst leaving ova with one X and one Y-chromosome (females) unaffected.

A second mechanism which would cause all female broods is thelytokous parthenogenesis. Parthenogenesis is the name given to the mechanism by which eggs undergo full development without having been fertilized. Thelytokous parthenogenesis is a particular type of parthenogenesis in which the unfertilized eggs all develop into females. A large number of Lepidopterous species in which parthenogenesis has been recorded are listed by Cockayne (1938). *P. potatoria* is mentioned on the list as are five other members of the family Lasiocampidae. However, again it seems unlikely that parthenogenesis is the cause of the unisexual broods in this case for several reasons. Firstly, Cockayne notes that in every species both females and males were produced when the brood was of reasonable size, and that the cause of such bisexual parthenogenic broods is probably that the division of chromosomes takes place without cell cleavage and that males are XX and females YY in constitution. Secondly in each of the three unisexual broods of *P. potatoria* in question normal mating was observed. This in itself could be taken to invalidate the idea of parthenogenesis, however, Robinson (1971) notes that the *magiella* form of *Luffia lapidella* is unique in that the reproduction is pseudogamous. In this form, the egg requires the stimulus of spermatozoa penetration to initiate development, but once inside the egg the sperm nucleus degenerates and does not fuse with the egg nucleus. Finally, it should be stressed again that whilst eggs were laid by the four N.G.C. females that were unmated, dissection and microscopic examination of these eggs showed that there was no development of these eggs.

An interesting hypothesis to explain unisexual broods in *Talaeporia tubulosa* Retz. was put forward by Seiler (1923). Seiler (1921) had shown that this species lacks a Y-chromosome and that the X-chromosome tends to lag on the spindle. Subsequently he showed that unisexual families with no males are due to non-disjunction of the X-chromosome during spermatogenesis. In this species the male has 60 chromosomes (58 + XX) and the female 59 (58 + X). He observed that during spermatogenesis the two X-chromosomes might remain united and be lost, so that spermatozoa with 29 chromosomes, containing no X, were formed. These fertilizing eggs with 30 chromosomes gave rise to exceptional females with 58 chromosomes but no X. Such exceptional females fertilized by males with normal sperm produced unisexual families consisting only of females. Embryos with 60, 59 and 58 chromosomes were seen, but although spermatozoa with two X-chromosomes due to non-disjunction might be expected to produce males with three X-chromosomes, no embryos with 61 chromosomes were seen, and it is probable that they fail to develop.

An analogous situation could conceivably explain the data on *P. potatoria* in question. *P. potatoria* has 62 chromosomes in both sexes (Kernewitz 1914, 1915, Beliajeff 1930), the Y-chromosome being present in the females. Non-disjunction of the X-chromosomes in a male producing spermatozoa with no X-chromosome could cause a brood of *P. potatoria* in which half the progeny were abnormal females, having just one X-chromosome and no Y-chromosome, whilst the other half would be abnormal females, having just one Y-chromosome and no X. This assumes that two X-chromosomes are required to produce maleness, and that the loss of one sex chromosome (irrespective of whether the X or Y is lost) does not produce inviability.

* In Lepidoptera the male is the homogametic sex carrying two X-chromosomes while the female is heterogametic having one X and one Y-chromosome. The X and Y-chromosomes in animals in which the female is heterogametic are traditionally called Z and W respectively, but in recent years there has been a tendency to drop the ZW symbolism and to employ XY in both situations.

If the majority of N.G.C. larvae which were taken came from a pairing of type described above, and a small number including the one male in the sample were progeny from a normal mating, the results obtained could be explained. Those females from the N.G.C. stock which possess just an X-chromosome would produce ova with either one X-chromosome or with no sex chromosomes in a 1:1 ratio. When such ova are fertilized by spermatozoa from a normal male a bisexual brood with a normal 1:1 sex ratio would result. The males in such broods would be normal having two X-chromosomes; however, the females would be abnormal having only one X-chromosome. Broods 2, 3, 4 and 6 could be of this type. N.G.C. females having just a Y-chromosome when mated with a normal male would produce all female broods. Half of the progeny would be normal having both an X and a Y-chromosome, and half would be abnormal having just one X chromosome. Broods 1, 5 and 7 could be of this type.

Such a hypothesis can only be conjecture and because of the untimely demise of the stock can not be either verified or disproved. Although the hypothesis does fit the data noted, there are two many uncertainties and assumptions within the hypothesis for it to be put forward as anything more than a possible explanation. Indeed if the comment made by Cockayne (1938), that the mere presence of one or two X-chromosomes is insufficient to determine whether a moth shall be male or female, is taken to imply that an individual with only one X-chromosome would not be female, at least in appearance and reproductive capacity, then the whole hypothesis is invalidated.

On the other hand, a situation approximating quite closely to that outlined above has been put forward to explain the occurrence of all female broods in a strain of *Abraxas grossulariata* Linn. described by Doncaster (1913, 1914, 1915) and Doncaster and Bamber (1922). The tendency to produce all female families or families with a vast majority of females was transmitted for six generations by direct descent with three exceptions, even when the male parent was unrelated. All the females of the strain, whether from unisexual or bisexual families had a diploid chromosome number of 55 instead of the normal 56. The propensity to produce these unisexual or nearly unisexual broods was inherited by half the daughters from unisexual families. Doncaster proposed that the unisexual broods could be produced by females with 55 chromosomes if they are lacking the Y-chromosome and if the X-chromosome is consistently included in the polar body, rather than in the egg nucleus. Cockayne (1938) suggests that the liability to produce unisexual families appears to be determined by a gene which is dominant or nearly dominant, and sex-limited, because there are no males to transmit it. Robinson (1971) notes that an analysis of the proportional mortality seems to exclude differential mortality of the male and says that on balance the study terminated very inconclusively.

It is possible that the situation noted in *A. grossulariata* is paralleled by *P. potato* although it should be remembered that all three unisexual broods in *P. potato* were completely unisexual.

No doubt other possible explanations could be formulated on the basis of the data observed for *P. potato*, but without the aid of a detailed karyological study and a more prolonged and rigorous breeding programme verification of any particular theory would be impossible. Undoubtedly, the phenomenon of all female or nearly all female broods in Lepidoptera needs a considerable amount of further work.

One final point may be useful to other students working on sex ratios in Lepidoptera. Smith (1944, 1945a,b) discovered that the resting nucleus may show sexually differentiated heteropycnosis, that is to say different amounts of contraction. The nuclei of the female displayed clear signs of positive pycnosis whilst the males did not. Examination of the resting nucleus enabled Smith to assess the probable sex ratio for newly hatched larvae of *Choristoneura fumiferana* Clemens.

Although the generality of sexual heteropycnosis for Lepidoptera species has yet to be explored, on this assumption Smith points out that the technique holds promise for investigation upon the very early diagnosis of the sex ratio.

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AN INTRODUCTION TO THE MESOCHORINAE (HYMENOPTERA, ICHNEUMONIDAE)

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INTRODUCTION

The purpose of this paper is to draw attention to the British Mesochorinae, an interesting group of the parasitic Hymenoptera in need of further study, and to provide a simple key to the four British genera at present recognised.

From rearing results some Mesochorinae are already known to be internal secondary parasites of the larvae of other insect parasites, including those of other Ichneumonoidea and of parasitic Diptera, having Lepidoptera and other Orders as their own primary hosts. They may all prove to be secondary parasites but knowledge of the biology of the sub-family is incomplete and more work and information on this question are needed.

It is hoped that workers in other fields who encounter Mesochorinae will, if they are not themselves drawn to them for study, feel encouraged to preserve them with all possible data for those who are studying them.

The species of our Mesochorinae are in need of revision and that task is not attempted in this paper. Morley's keys (1915) should not be used. There is below a brief description of the characters distinguishing the Mesochorinae from other subfamilies of the Ichneumonoidea, on the assumption that the reader can distinguish the superfamily Ichneumonoidea from other Hymenoptera. The Mesochorinae have a fore and hind wing venation characteristic of the family Ichneumonidae (as opposed to the Braconidae) within the Ichneumonoidea, see figs. 1 to 4. If the reader is in doubt he is referred to Richards (1977). Then follows a key to the genera using characters which can be seen with the use of a good hand lens ($\times 10$ to $\times 15$) in good illumination. Characters given in square brackets in the key may call for use of higher power and will, it is hoped, be of additional help when such power is available.

The Mesochorinae can be distinguished from other subfamilies of the Ichneumonidae by the following combination of characters:—

The clypeus and face together form a broad, slightly convex surface and the clypeus is not separated from the face by a groove (fig 8). The face often (but not always) has a transverse or oblique ridge below the antennal sockets (fig 8). The male clasper (paramere) ends in a long rod (fig 10) and the female subgenital plate (hypopygium) is large and triangular in profile (fig 9). The ovipositor sheath is relatively broad (fig 9) but the ovipositor itself is slender and without ridges or a dorsal notch. Finally, and characteristically, cell 2Rs (the areolet) of the forewing is rhombic and usually large (figs 3 and 5).

Although in a few other ichneumonid subfamilies there is no groove separating the clypeus from the face, the combination of characters mentioned above is never the same. Also, the male clasper in the form of a rod has before now led to misidentification of sex, but with a few specimens in which both sexes are represented that difficulty is soon overcome. Indeed, before attempting to run individuals to genera, it is as usual helpful to have collected or assembled as many specimens as possible for comparison. The number of species given for each genus is that in Britain shown in Fitton (1978 in Kloet & Hincks).

KEY TO GENERA

1. Hind wing with distal abscissa of Cu1 present (fig 4): this is not always obvious at first glance and care is needed. Lower face lacking a transverse

- groove from edge of clypeus to eye. 2
- Hind wing with distal abscissa of Cu1 completely absent (fig 6). Lower face with a transverse groove from edge of clypeus to eye (fig 8). 3
- 2. Larger insect, forewing up to about 12 mm long; seldom shorter than 7.5 mm (though as with all parasitoids, exceptionally small specimens do occasionally occur), with the combination of characters associated with nocturnal or crepuscular behaviour as follows:
 - pale yellow-brown background colour of the insect as a whole, large ocelli, and long antennae.
 - Eye conspicuously emarginate dorsally to the antennal fossa and strongly convergent laterally to the ocelli [1st segment of the gaster lacking a lateral carina posteriorly; maxillary palpus elongate; claws strongly pectinate to apex] *Cidaphus* (2 species)
 - Smaller insect with forewing length usually between 7.5 mm and 5.0 mm; darker and without the combination of characters associated with nocturnal or crepuscular behaviour; eye margins subparallel and not strongly emarginate, [1st segment of gaster with a lateral carina posteriorly; maxillary palpus of normal length; claws with 3 to 5 teeth at base] *Astiphromma* (11 species)
 - 3. Forewing with cua opposite M and Rs, or nearly so (fig 5); 1st segment of gaster usually polished posteriorly, longitudinally striate in some species; legs varying from elongate and slender to short and stout; [prepectal carina incomplete, distinctly separated from raised marginal rim of mesopleuron] *Mesochorus* (34 species)
 - Forewing with cua noticeably separated from M and Rs by a section of Cu1 usually equal to it in length (fig 7); 1st segment of gaster longitudinally striate posteriorly; legs short and stout; [prepectal carina complete, reaching raised marginal rim of mesopleuron] *Stictopisthus* (3 species)

NOTES ON THE KEY TO GENERA

With enough material *Cidaphus* and *Astiphromma* should not be difficult to separate from one another or from *Mesochorus* and *Stictopisthus*. The warning to be sure of the presence or absence of the distal abscissa of Cu1 (which is not always easy) is repeated.

Mesochorus and *Stictopisthus* with forewing length usually between 7.0 mm and 3.0 mm are generally smaller than *Cidaphus* or *Astiphromma*.

More difficulty may be experienced sometimes in distinguishing between *Mesochorus* and *Stictopisthus*. The first character given in the key for each genus I have found to be reliable. The other characters in the key are also helpful in confirmation. Additional characters given by authors dealing with exotic fauna, particularly that concerning the shape of the transverse ridge at the upper edge of the face, which is present in all *Mesochorus* and *Stictopisthus* as well as in some *Astiphromma*, I have not found wholly reliable in British material. Some consider that on morphological grounds *Stictopisthus* should be treated as a subgenus of *Mesochorus*. Others think that the generic distinction is valid and suspect that the biology of the two genera will prove to be significantly different.

Some species of *Mesochorus*, like all known *Cidaphus*, are nocturnal or crepuscular and have the combination of characters which Gauld & Huddleston (1976) term "Ophionoid facies". This does not seem to be the case with any British species of *Stictopisthus*.

As between *Mesochorus* and *Stictopisthus* relative numbers of New World species recognised by Dasch (1971, 1974) may also be of interest. Of the Nearctic fauna he recognised 96 species of *Mesochorus* and only 9 of *Stictopisthus* (of which the female of one is unknown) and of the Neotropical fauna the numbers are 245 species of *Mesochorus* and 11 of *Stictopisthus*.

Because the species of the Mesochorinae are in need of revision, the list of Fitton (1978 in Kloet & Hincks) should not be regarded as definitive. For example Professor Varley (personal communication) suggests that a third *Cidaphus* should be added to the British list. Gauld & Huddleston state also that three species of *Cidaphus* have been recorded at MV light traps.

NOTES ON BIOLOGY

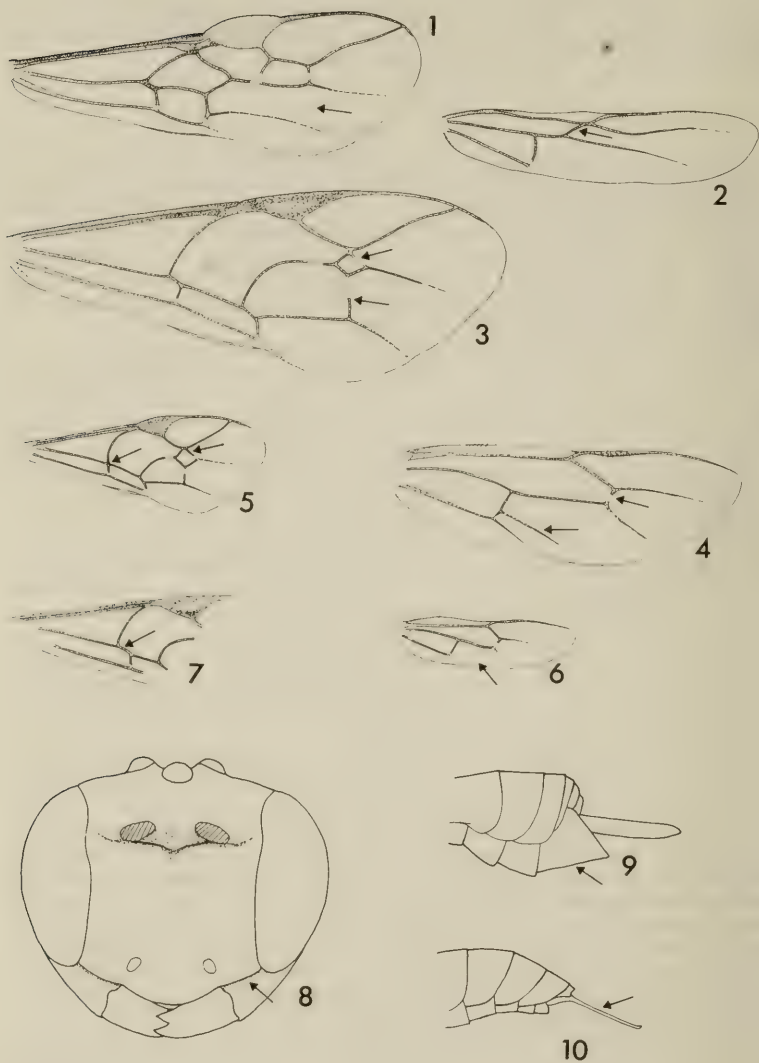
1. Data seen suggest that species of *Astiphromma* and of *Mesochorus* are on the wing during April and through the summer into October. Those of *Mesochorus* have, exceptionally, been taken as late as November and December. The flight periods of individual species are not necessarily so extensive. Records of *Cidaphus* suggest a more restricted flight period; in May and again, in September and October, but further collecting and breeding may modify this impression. The information about *Stictopisthus* is so little that one cannot at present safely say more than that it appears during high summer.

2. Among recent writers Townes (1971:83), while regarding the principal known role of mesochorines as that of secondary parasites, nevertheless suggests there is evidence "not yet refuted" that some species are primary parasites. The suggestion of primary parasitism is made even more strongly by Dasch (1971:1) (when dealing with the Nearctic Mesochorinae) who, after mentioning that many of the smaller species are secondary parasites, says "In addition, considerable rearing evidence seems to indicate that many species are primary parasites of lepidopterous and coleopterous larvae". This latter view does not however seem to be repeated by Dasch (1974) when dealing with the Neotropical Mesochorinae. Of course host data taken from species labels may be unreliable and often cannot be satisfactorily questioned. Certainly, of the two views on possible primary parasitism mentioned by Dasch and Townes that expressed by Townes seems so far to be more apt for British genera. Indeed Shaw & Askew (1976:49), go further – "Although a few records suggest that species within this subfamily may occasionally develop as primary parasites of Lepidoptera, obligatory secondary parasitism is so prevalent in all British genera . . . that it seems likely to be the rule for all our species". Clearly, more information is needed.

3. If all or most mesochorine species prove to be obligatory secondary parasites it will be desirable to try to discover whether more than one strategy is adopted to reach the secondary host.

The best known (perhaps the only known) egg laying strategy seems to be the placing of the egg in the body of the primary parasite larva while it is within the primary host. The stage of development both of the primary and of the secondary host may also be important (Richards, 1940). It has been suggested that any egg laying strategy of this degree of refinement will have taken a long time to evolve and one question worth trying to answer is whether all mesochorines which are obligatory hyperparasites do employ the same strategy or whether any resort to strategies similar to those adopted by other known hymenopterous and dipterous hyperparasites (see Clausen, 1940; Askew, 1971).

4. In both his works Dasch evidently regards Mesochorinae, because of their known role of secondary parasites, as economic liabilities in the context of biological control. This assessment no doubt has to be considered in relation to the introduction of exotic species of parasitic insects to effect control. Nevertheless in an endemic population, whether the primary host is regarded as a pest to be controlled or as a creature (such as a threatened butterfly) to be protected, the effect of a secondary parasite on the host-parasite-hyperparasite complex and its stability may be subtle and difficult to determine (for general information about these sorts of problems the reader is referred to Varley, Gradwell & Hassell (1973) and Askew (1971).



Macrocentrus nidulator (Nees) (Braconidae): 1. fore; 2. hind wing. *Astiphromma strenuum* (Holmgren): 3. fore wing; 4. hind wing. *Mesochorus gracilentus* Brischke: 5. fore wing; 6. hind wing; 7. Part of fore wing of *Stictopisthus* species. 8. Head of *Mesochorus tachypus* Holmgren. Apex of gaster of: 9. *Astiphromma strenuum*, female; 10. *A. marginellum* (Holmgren), male.

CONCLUSION

Present data suggest that, in Britain, members of the subfamily include species which are secondary parasites of Lepidoptera and Symphyta (Hymenoptera) through members of the Ichneumonidae and Braconidae (Hymenoptera) and of the Tachinidae (Diptera). Further researches may reveal that primary and secondary hosts belong also to other families or even to other orders.

Not only is reliable up to date information about these things needed, but as much material as can be obtained is required to throw light on such matters as egg laying strategies and the stages of development of hosts when they are attacked.

Workers with other Orders and families who encounter mesochorines are the best placed to provide this information which could significantly increase our knowledge. Those who find they cannot extend their activities to a study in depth of the mesochorines are urged to preserve all the material they meet with, including all host remains as well as imagines, together with full data, and to deposit it in a collection such as that of The Department of Entomology, Hymenoptera Section, The British Museum (Natural History), Cromwell Road, London SW7 5BD where it can be held and be available for further study. Imagines need not be mounted; they are best preserved in 95% alcohol. What is important is that they be in as good condition as possible. Also, each imago should have separately associated with it all host remains and any other material (e.g. pupa, cocoon etc.) with all other relevant data.

If this is done, not only will our present knowledge of the group's biology be advanced but that advance may well itself encourage a much needed systematic revision of the species of each genus. This could in turn greatly encourage further biological study.

In preparing the key in this short paper I have relied greatly upon that given by Dasch (1971) and I am indebted to Dr M. G. Fitton for drawing the figures.

I wish also particularly to thank the following for providing material or information (or both) as well as for suggestions and comment about problems posed by the biology of the Mesochorinae:— Dr A. A. Allen; Dr R. R. Askew; Mr J. Brooks; Miss M. Brooks; Mr A. R. Cronin; Dr M. G. Fitton; Mr I. D. Gauld; Professor O. W. Richards; Dr M. R. Shaw and Professor G. C. Varley.

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COLEOPHORA LINOSYRIDELLA FUCHS NEW TO BRITAIN

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DISCOVERY BY N.F.H.

I attended a field meeting of the Kent Field Club at Shellness, Leysdown-on-Sea, Kent, on 18.vi.1978. For protection from the wind, I scrambled down a bank fringing the saltmarsh, where I immediately noticed the characteristic feeding signs of a coleophorid larva on the young developing leaves of *Aster tripolium*. An hour's diligent searching produced four cases, but regrettably none of these were reared and identification was not possible.

Thinking that this could be a hitherto unrecorded foodplant for *C. trochilella* (Dup.), I revisited the site on 1.vi.1979, an earlier date to minimise the possibility of larval parasitisation. I was rewarded by finding 13 cases. These were sleeved at home on a rooted plant and nine imagines subsequently emerged 17-27.vii.1979.

Mr. R.W.J. Uffen could not recognise the species at the BENHS exhibition. He subsequently informed me that the genitalia were unlike those of any species that he had seen and referred the specimens to Dr Sattler at the British Museum. Photographs of the male and female genitalia were then sent to authorities abroad by Dr Sattler, eventually resulting in identification by Mr Baldizzone of Italy.

Leysdown was revisited on 24.v.1980 in the company of Mr. Uffen and Mr. J.M. Chalmers-Hunt, and 20 cases were seen, mostly already of mature size.

EUROPEAN DISTRIBUTION AND FOODPLANTS

Jäckh (1957) describes the moth and case from *Crinitaria linosyris* (L.) Less. in the Rhine valley, whence Fuchs described the species. Jäckh comments that *linosyridella* is indistinguishable superficially from *vlachi* Toll on the same foodplant. *Vlachi* has quite distinct genitalia and may also turn up in Britain. Jäckh's photographs show the case of *vlachi* to be slightly the shorter and slimmer, with a narrow, longer neck.

Baldizzone (1979) synonymised *C. nicaeella* Chrétien, reared from *Aster punctatus* D.C. at Nice (but the ♂ ♀ genitalia are at least subspecifically distinct). Baldizzone records *C. linosyridella* also from Yugoslavia and includes *Aster acris* L. as a foodplant.

BRITISH DISTRIBUTION AND FOODPLANT

Crinitaria linosyris is a rare plant of western coastal limestone cliffs in Britain and its fauna has probably not been closely examined.

The larvae at Leysdown are restricted to young *Aster tripolium* germinating at the drift line at the foot of the sea wall. Another colony is now known at Nagden, Kent. Single larvae have since been found in an identical situation at Canvey Island, Essex. In this situation the larvae are subject to infrequent inundation and have less danger of being swept away than in the typical situation of occurrence of mature Sea Aster. They readily drop off the plants. The numbers of larvae present in these places is so small as to make their persistence a matter of some surprise. Possibly the larvae are very thinly spread in the general saltmarsh zone. There are no obvious alternative foodplants.

R.U.'s larvae declined Michaelmas Daisy (*Aster nova-belgae* L.), China Aster (*Callistephus chinensis* (L.) Nees and *Solidago virgaurea* L.

LARVA

As with many related species, the head is light brown with black eyes and a dark hind margin; the prothoracic shield is transparent pale brown, darkened diffusely round the hind margin; other thoracic plates are contrastingly fuscous.

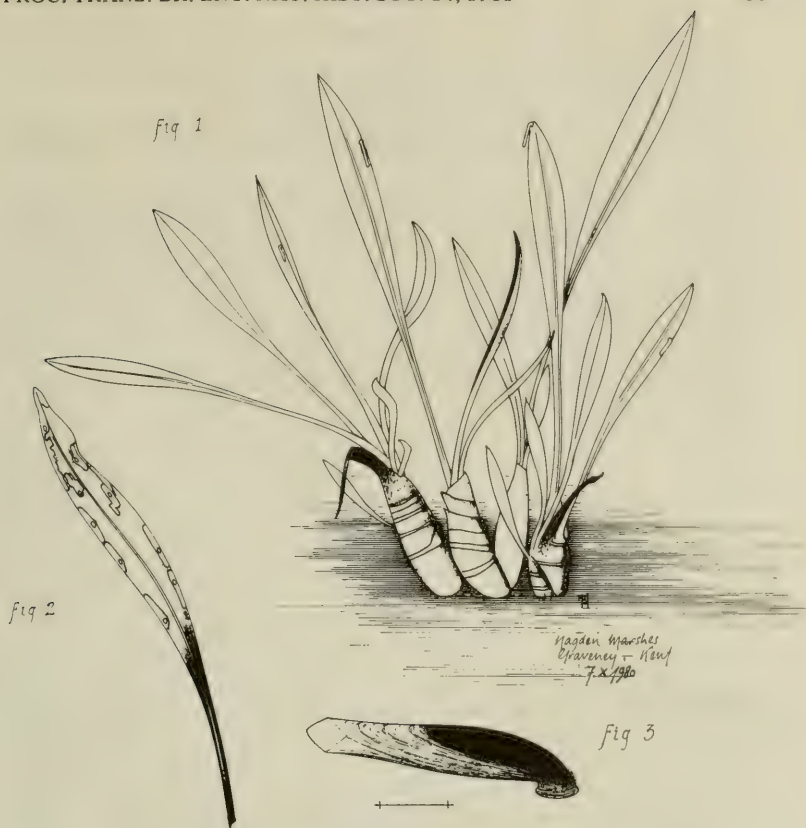
*COLEOPHORA LINOSYRIDELLA* Fuchs

Fig 1 Autumn larvae in hibernation.

Fig 3 Case of fully fed larva $\times 4$.

Fig 2 Leaf showing feeding of final instar larvae.

The posterior pair of dorsal mesothoracic plates are shortly triangular and are separated in dorsal view by about their own basal breadth. The metathorax bears only an anterior pair of dorsal plates. The general aspect of the thoracic sclerites is one of bold, well-separated roundish blotches.

There are tiny pigmented areas round the spiracles of abdominal segments 1, 2 and 9, as in *troglodytella*.

The larva is whitish. The ventral ganglia are pigmented, but nearly invisible beneath other tissue beyond the fourth abdominal segment in the only larva examined for this feature.

CASE

The case is cylindrical, entirely silken and whitish to ochreous, finely striated from the many zones of enlargement, with a darker 3-5 mm long overwintered portion antero-dorsally. The final length is 8-10 mm, the profile convex with a maximum diameter of 1.5-2.0 mm. The mouth opening is distinctly necked to make the case prostrate or up to about 20° from the substrate. There is a light decoration of minute black speckles and the overwintered portion may be green with algal cells.

MOTH

The male is larger at 12.5-13 mm wingspan than the female at 11.5-12.5 mm, but there is no sexual dichroism as in some related species.

Antennae with the brown flagellar rings indistinct against an ochreous ground or clearer against a cream ground. Scape ochreous. Palpi ochreous, third segment short.

The forewings have a much lower contrast pattern than other British species of this group: the pale streaks are not white. Forewings brownish-ochreous, some very dull; dull creamy lines along the costa (and costal cilia superficially), from the base of the wing approaching the costa at the proximal end of the cilia, two radial lines towards the wing tip, all joined across their tips, a medial line bent up before the tornus, one in the fold and one along the posterior margin. Sometimes there are fuscous dashes parallel to the costa between the tip radial lines and further fuscous marks on the tornal cilia, which are greyish fuscous.

Hindwings greyish fuscous. Anal tuft ochreous, abdomen grey.

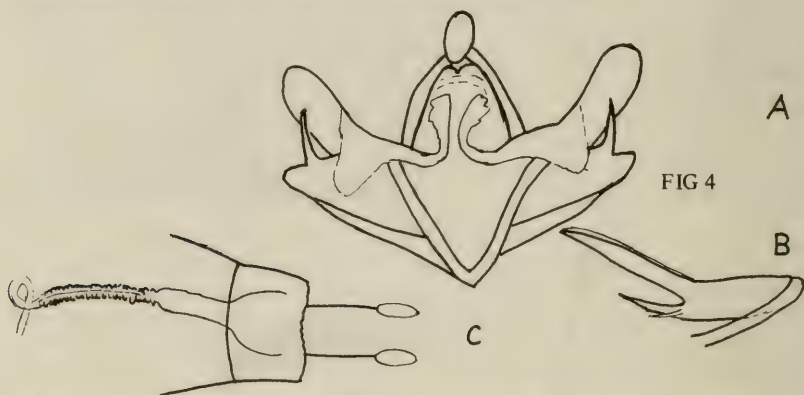


Fig 4 Genitalia of *Coleophora linosyridella* Fuchs, partly after Jäckh. A - male. B - aedeagus. C - Female excluding the unsclerotised ductus.

Forelegs anteriorly fuscous, posteriorly ochreous. Mid tibia dull ochreous with a fuscous line. Hind tibia creamy with a fine central longitudinal fuscous line and ochreous dorsal cilia. Hind femur dull ochreous.

The striped hind tibia is a character found in both sexes of patterned species with a bifid aedeagal support. It is particularly useful in shortlisting worn light trap material, e.g. of the feebly patterned rush feeders.

GENITALIA

The male has the prong from the apex of the sacculus across the valva as *trochilella* and other species, but the aedeagal support has a characteristic spur towards the base with associated spines. The female has the duct contracted within the eighth segment and the spining starts about as far before that segment as the segment's own length. In both sexes *vlachi* Toll is the closest species.

* * * * *

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BUTTERFLIES IN CORFU (KERKYRA) IN LATE AUGUST, 1980.

by D. W. BALDOCK and R. F. BRETHERTON

PART II

A PROVISIONAL LIST OF THE BUTTERFLIES OF CORFU (KERKYRA)

No comprehensive list of the butterflies of Corfu is known to us. The earliest references traced are contained in Staudinger's "Contribution to the lepidopterous fauna of Greece", which was published in 1871. These are, however, incidental and clearly not complete. Accounts of collecting butterflies in Corfu were published by several British visitors later in the last century, and also in 1926 and 1977. In 1910 and 1912 the well known Austrian entomologist Dr. Hans Rebel, as part of his general study of the Lepidoptera of the Ionian Islands, made use of some of their records to supplement the results of some of his own slight collecting in Corfu plus material from several other Austrian collectors which had come into the possession of the Hof Museum at Vienna. None of this information, however, appears to have come from visits longer than about one month. No account of resident collecting or recording has been found, and much of the island, especially towards its southern end, seems to remain entomologically largely unexplored. The nomenclature used in the early accounts is now much out of date and in some cases of uncertain application; some parts of the season are covered imperfectly if at all by them; and they are scattered in many articles in periodical literature, most of which is not readily accessible without visits to libraries and special search.

Corfu is now frequently visited by many naturalists both amateur and professional, who wish to know what they are likely to see there and to add to present knowledge; and the lepidopterous fauna of the island has some special interest because of its geographical position and its relatively well-watered and fertile character. For these reasons it has seemed worth while to bring together in a single provisional list a summary of the existing records, together with those in part I of this article. Unfortunately the specimens referred to by the early British collectors appear to have been lost or dispersed and have therefore not been checked. Though some of the published accounts include some references to the moths, the information about them is so slight that the production of even a provisional list of them would be premature. The field for further work on both macro- and micro-moths of Corfu is clearly very wide.

The sources used are as follows:

Staudinger, O., 1870. Beitrag zur Lepidopterenfauna Greichenlands. (*Horae Soc. Ent. Rossicae* 7: 1-301). In this general work there are definite mentions of the occurrence in Corfu of some 20 species. Staudinger said, however, that he had seen few specimens from the island, and he relied, apart from some records provided by his friend Dr. T. Krueper, on a list which he had received at second hand of Lepidoptera said to have been collected there about 1856 by Josef Erber. Many of Erber's specimens later came to the Hof Museum, Vienna. These were checked and quoted as a source for Corfu by Rebel (1910 — see below), who, however, did not repeat some of Staudinger's records from Erber. Dates and localities were not mentioned by these authors.

Norris, F. B., 1891. Notes on Rhopalocera in Corfu, 1891 (*Entomologist* 24: 179-180). Norris spent the last half of May and the first half of June in Corfu. He said that during this stay no rain fell. He recorded 46 species, not including "one or two Skippers which I have not quite determined". For most he gave indications of abundance and of their habitats, and for a few, precise localities which show that he had explored fairly widely in the central part of the island.

- Matthew, Paymaster-General G. F., 1898, in Notes on Lepidoptera from the Mediterranean (*Entomologist* 31: 77-84, 108-116). These records are part of an interesting account of collecting near various ports which the author visited during a naval tour in the summer of 1897. He was in Corfu August 4/12 and September 21/28. "Omitting common species", he mentions 22, of which five or six had not previously been reported, with comments on specific forms and abundance but little detail of localities.
- de la Garde, P. G., 1899. Mediterranean Lepidoptera (*Entomologist* 32: 8-12), added to Mathew's list a number of other records, mostly dated May 22/27, or July 6, while on similar visits, recording 18 species in all from "King's Park, an ideal place for collecting".
- Rebel, H., 1910. Beitrag zur Lepidopterenfauna der Ionischen Inseln; 1912. Beitrag zur Lepidopterenfauna von Corfu. (*Verh. Ges. Wien* 60: 418-431; 62: 12-15). In this main work on the Ionian islands Rebel cited for Corfu records from his own very short visits in 1896 and in early July 1904; records or specimens collected by G. Paganetti during April and May 1903, by F. Wagner in the second half of June 1907, and by H. Ritter von Woerz in April/May 1910; and data derived from Erber's specimens of about 1856 which have been mentioned above. These together gave only 27 species; but in footnotes he accepted some further 20 species mentioned by Norris and de la Garde, but he was apparently unaware of those by Mathew. Rebel himself collected in the Achilleion Park near the east coast south of Corfu town, but only mentions a few localities for other records. His further note of 1912 adds seven species to his previous list and gives additional records for nine others. It is derived from specimens then in the Hof Museum collected by H. Ritter von Woerz in October 1910 and by Hauptmann J. Polatzek from May 25 to June 12, 1895.
- Graves, P. P., 1926. Collecting in the Balkans in 1925: I, Corfu and Athens (*Ent. Rec. J. Var* 38: 85-87). This author, who had much experience of Balkan and Near East Lepidoptera, collected in Corfu during five days, July 4/9, 1925, in the valley of Mon Repos on the outskirts of Corfu town, on rough ground by the mouth of the river Potamos a little to its north, and in olive groves near Benitza, on the east coast some twelve miles south of the town. His own captures were 33 species, to which he added a "spring list" recorded by Wyndham Forbes with dates from April 11 to May 25, which provided 18 species, of which ten were additional.
- Koutsaftikis, A., 1973. Nachtrage, Ergänzungen und Ökologisch-Zoographische Berechtigungen der Nymphalidae-Fauna (*Beitr. naturk. Forsch. Sudwdtl.* 32: 169-177). This mentions incidentally, without dates or details, the presence of five Nymphaline species in Corfu, one of which has not been mentioned otherwise.
- Lipscomb, Major General C. G., 1977. Corfu Butterflies in Spring 1977 (*Ent. Rec. J. Var.* 89: 326-328). This account of a visit from April 23 to May 1 refers to 23 species. It confirms several records previously doubtful, and contains much interesting detail on abundance, localities and behaviour.
- We are also indebted to John G. Coutsis, of Athens, for a private list of 57 species, derived mainly from published records but also in some cases from information in personal correspondence. It contains one species not otherwise reported.
- The order and nomenclature used below follow that of Higgins & Riley, 1980, *A Field Guide to the Butterflies of Britain and Europe* (4th, revised, edition). Names of species used by the authors quoted in the list have been translated to this nomenclature without comment, except where there is now doubt as to the identity of the species mentioned; but varietal names have been left unchanged.
- The following abbreviations of recorders' names have been used, the initial of

supplementary recorders being placed in parenthesis after that of the main author, as follows:

Staudinger, O.	S	Graves, P. P.	P	Krueper, T.	(Kr)
Norris, F. B.	N	Koutsaftikis, A.	K	Erber, J.	(E)
Mathew, G. F.	M	Lipscomb, C. G.	L	Polatzek, Joh.	(P)
de la Garde, P. G.	DG	Baldock, D. W.	B	Wagner, F.	(W)
Rebel, H.	R	Coutsis, John G.	C	H. Ritter von Woerz	(RW)
				Forbes, Wyndham	(F)

The names of species of which the recorded identity is doubtful, or whose presence in Corfu appears to need confirmation, have been placed between square brackets [].

Papilio machaon (L.) N, common on mountain tops; M, common; R, Achilleion Park 5/7.vii.1904; G, Vido Island; L, Aghios Mattheos, 26.iv.1977 one, Kellia 26.iv, one; B 1980.

P. alexanor (Esp.). N, much less common than *P. machaon* and *I. podalirius*, and earlier; G(F), 24.v.1926, one only.

Iphiclides podalirius (L.). N, common on mountain tops; M, common; R, Achilleion park, G, two in gardens; L, Aghios Gordius 24.iv.1977, Kellia, 27.iv.77; B, 1980.

[*Zerynthia polyxena* (D & S). S(E); R gives Val di Ropa, April (Mocarszski), a dark yellow female of ab. *ochracea* Stgr. These records may refer to the same specimen. In the absence of later records of this conspicuous species, confirmation of its presence in Corfu is needed.]

Pieris brassicae (L.). S(E); N, fairly common, DG; R and R(P); G; B, 1980.

Artogeia rapae (L.). S(E); N, fairly common; R; G; L, Paleokastritza 19.iv.1977, common on cultivated ground; B, 1980.

[*A. ergane* (Geyer) N, rare. Lack of later records and possibility of confusion with other Pierid species makes confirmation necessary.]

A. napi meridionalis (Heyne). B, 1980.

A. knieperi (Stgr.). B, 1980; privately listed by C, but date and source unknown.

Pontia daplidice (L.). N, common in the lowlands; DG, 22/27.v; R flying in town 4/7.vii.1904; R(E); G, "scarcely any"; L, Sidari 4.v.1977, one female.

Euchloe crameri (Butler). S(E); N, common; G(F), Gastouri, 11.iv one of first brood, second brood from 20.v.1925.

[*E. tagis* (Hüb.) var. *bellezina* Obth. N, common on hills. This record was rejected by R, as no form of *E. tagis* is known to occur east of southern France. Probably a misidentification of very small examples of *E. crameri*.]

Anthocharis cardamines (L.). S(E); R(E), many; G(F), on Aghia Dekia mountain 6.v.1925.

Colias crocea Fourc. N, abundant; M, two female f. *helice*; R(P), R(W) ab. *faillae* Stef., and f. *helice* Hubn. 27.v, ab. *helicina* Obth. 12.vi; G; G(F); L, Sidari, 1.v; B 1980.

Gonepteryx rhamni (L.). N, remarking that the next species is commoner.

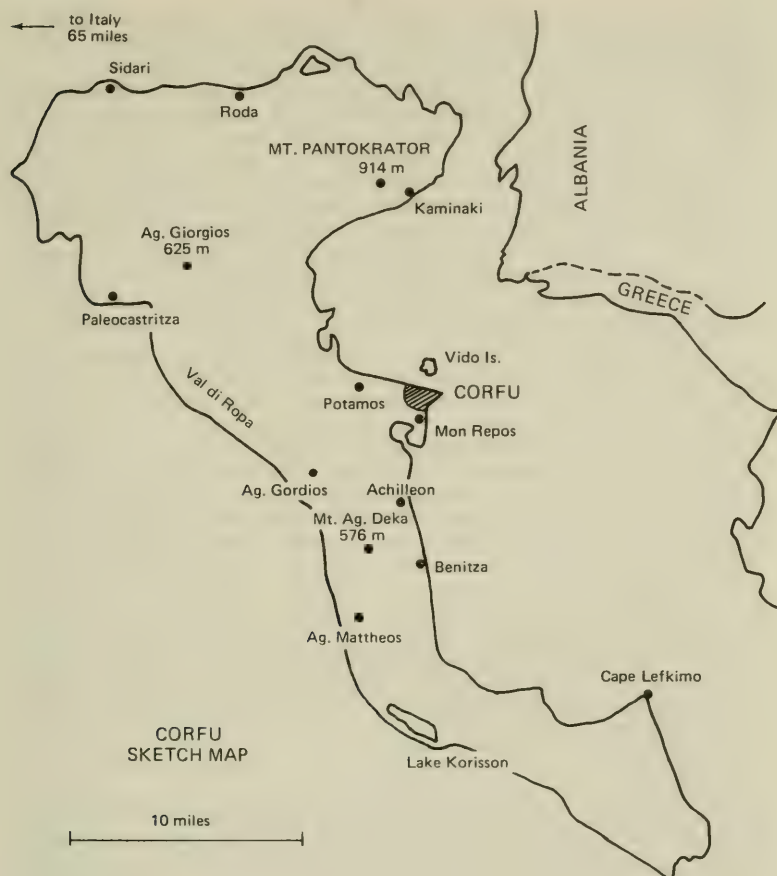
G. cleopatra (L.). N; M, one male; R, Achilleion park and elsewhere; R(P), 27.v/12.vii, in fresh specimens; G, in Mon Repos gardens, "of the Greek race"; G(F), 13.iv, frequent; L, Paleokastritza 19.iv.1977; B, 1980.

Leptidea sinapis (L.). S(E); N, very large, with ab. *diniensis*; M, the most abundant species seen, by road sides and in olive groves; R(P), var. *diniensis* and ab. *erysimi* Borkh. 27.v.1895; G, mainly in olive groves near Benitza; L, Aghia Gordius 24.iv, many; B, Apparently in three seasonally dimorphic generations.

Nordmannia ilicis (Esp.). S(E); N, abundant on low bushes on hill slopes.

Strymonidia spini (D & S). S(Kr); R(E).

- [*S. w-album* (Knoch). DG, 22/27.v.1899: rejected by R as probably a misidentification of *N. ilicis* or *S. spini*. *S. w-album* occurs locally on the Greek mainland; but this date seems too early for it.]
- Callophrys rubi* (L.). N, on hills in May; G(F), Mt. Aghia Deka, 6.v; L, Paleokastritza, 19.iv.1977, fairly common.
- Lycaena phloea* (L.). N, var. *eleus*, common; M, a few; G, specimens heavily suffused and large; L, Mt. Pantokrator, 29.iv, one; B, 1980.
- Lampides boeticus* (L.). G, not rare; B, 1980.
- [*Heodes alciphron* Rott. N, not rare, May. Not otherwise reported. The species is local in mainland Greece and Albania; but the possibility of confusion with other "Coppers" cannot be excluded.]
- Syntarucus piriethous* (L.). M, several; DG, 22/27.v; G, one male; B, 1980.
- Tarucus balkanicus* (Frr.). B., 1980.
- Cupido minimus* (Fuessly). N, on Mte Salvatore, (Mt. Pantokrator), May; G(F), 29.iv.1925.
- Celastrina argiolus* (L.). N; R, in Achilleion park; M, common on bramble blossom, females laying on terminal shoots; R(W), April and May, many; G(F), 13.iv; B, 1925.
- [*Glaucopsyche melanops* (Bdv.). N, "on bushy slopes". Rejected by R as probably a misidentification. The species is not known in Europe east of Liguria in north Italy.]
- G. alexis* (Poda). G(F), on Aghia Deka mountain, 6.v.1925; L, Mt. Pantokrator, 29.iv.1977.
- Pseudophilotes baton* (Bergstr.). R(E); G(F), from 19.iv.1925, not common.
- Plebejus argus* (L.). S(E); R(P), a small female 4.vi.1895; G(F), 20.v.1925.
- [*Lycæides idas* (L.). S(E), but not supported by specimens examined by Rebel, and not otherwise recorded. In view of easy confusion with *P. argus*, confirmation needed. In mainland Greece a much more local and scarcer species.]
- Aricia agestis* (D & S). R(P), 9.vi.1895; G, as var. *calida*, 4/10.vii.1925, abundant; L, Aghios Gordius, 24.iv.1977, odd specimens.
- Agrodiaetus thersites* (Cant.). G, in valley of Mon Repos, and also south of Benitza, 4/7.ix.1925, five specimens, new to Corfu.
- Polyommatus icarus* (Rott.). DG, 22/27.v; R(W), common, with ab. *celina*, R(P); R(W); many; M, abundant, remarkably small; L, Aghios Gordius, 24.iv.1977, a few; G, many, var. *zelleri*; B, 1980.
- [*Libythea celtis* (Laich). C, source of record unknown. Locally common among *Celtis australis* in Greece and Albania, but confirmation for Corfu desirable.]
- Charaxes jasius* (L.). S(E); N, first seen at end of May, more abundant in June, on higher mountain tops, such as Mte. Matthie, San Georgio, etc., among *Arbutus*.
- Limnitis reducta* (Stdgr.). N, on bushy, sheltered slopes; M., one male, of gen. II; DG; R, in Achilleion park 5.vii.1904; G, in valley of Mon Repos 4/7.vii.1925; G(F), 20.v.1925; L, Kellia, 27.iv.1977, one; B, 1980.
- Nymphalis antiopa* (L.). N, not common; L, Kellia 27.iv.1977, one; Lake Korissos, 30.iv, one flying among high branches of willows.
- Nymphalis polychloros* (L.). N, seen in Corfu town and park, over trees; L, Aghios Mattheos, 26.iv.1977, one reported at rest on a tree trunk, by another observer.
- Inachis io* (L.). S(E); N, not common; K, (1973), without detail.
- Vanessa atalanta* (L.). N, common; DG; R, Achilleion park; G; L, Paleokastritza 19.iv.1977, one; B, 1980.
- Cynthia cardui* (L.). N, common; DG; R(RW); G; L, Corfu park 18.iv.1977, many worn on flowers of stock, B, 1980.
- Aglais urticae* (L.). N, var. *turcica*, rare.
- Polygonia c-album* (L.). DG, 6.vii.1899; K, Paleokastritza, no date; B, 1980.



P. egea (Cramer). N, common; M, common, small specimens; DG, 6.vii; R, Achilleon park 5.vii.1904; G, in all localities visited; B, 1980.

Pandoriana pandora (D & S). R, Achilleon Park, 5.vii.1904; B, 1980.

Argynnis paphia (L.). S(E); M, King's park, Corfu, several; G(F), frequent 22/25.vi; G, in all localities visited, of the huge local race *f. kerkyrana* Buresch; B, 1980.

[*Fabriciana adippe* (D & S). K; C, without date or detail; not otherwise reported.]

[*Issoria lathonia* (L.). S(E), not supported by Rebel, and not otherwise reported.]

Melitaea cinxia (L.). N, in May, not common; G(F), 11.v.1925, a few worn; L, Mt. Pantokrator 29.iv.1977, one.

Melitaea phoebe (D & S). N, on hill tops, May.

M. didyma (Esp.). N, very common; M, common, females variable, of gen. II or III; DG; R(P), 27.v/12.vi, var. *meridionalis* Stgr. and male ab. *graeca* Stgr., G(F), first 18.v; G, Benitza 4/7.vii.1925, one *f. dalmatina* of early gen. II; K; B, 1980.

- Melanargia larissa* (Geyer). S(E); N, abundant in June; DG, 22/27.v.1899; R(W), Aghia Dekha, Paleokastritza; G(F), 20.v.1925; G, on coast above Benitza, 4/7.vii.1925, many "of the south Albanian race f. *freyeri* Frhst".
- [*Hipparchia fagi* (Scop.). N, as *hermione* (L.), common on mountains, settling on rocks and trees, females measuring nearly 3 in.; M, common; R, Achilleon park, 5.vii.1904, very large, brightly coloured specimens. At these dates, however, the structural differences, decisive only in the genitalia and Jullien organ, between *H. fagi*, *H. syriaca* and *H. alcyone* (D & S) were not clearly recognised. Although the large size and bright colour, and also Norris' description of the habitat, suggest *H. fagi*, it is not possible to be sure without specimens to which species these records refer. *H. fagi* and *H. syriaca* are superficially almost indistinguishable in their Greek races; *H. alcyone* is not known from the Balkans, but is widespread in mountains in south Italy.]
- H. syriaca* (Stgr.) *serrula* Frhst. Separated from *H. fagi* by Jullien in 1909. G, 7.vii.1925, abundant in olive groves near Benitza. One of his specimens was later dissected by Hemming (*Entomologist* 76: 68-72, 1943) and Graves' original identification was confirmed. The species is widespread in Greece and on the Adriatic coast.
- [*H. semele* (L.). N, common, females very large; DG, 22/27.v.1899; R, Achilleon park, 5.vii.1904; G, trans ad *cadmus* Frhst., swarming in shrubberies of Mon Repos. rare in olive groves. Since these dates several of the taxa then included in *H. semele* have been given specific rank, and specific definitions in the group are still fluid and controversial. *H. semele* as recently defined (Kudrna, 1977) is not certainly known on the Greek mainland, and these records probably refer to the next species. *H. aristaeus* or, just possibly, to the more recently separated *H. delattini* (Kudrna, 1975).]
- [*H. aristaeus* (Bonelli). M, var. *aristaeus*, 4/12.viii.1897, mostly large females, dark, averaging 2½ in. wing expanse. As *H. aristaeus senthes* Frhst. is widespread in Greece and Albania, this attribution is probably correct; but structural examination of Corfu specimens is needed for certainty.]
- Neohipparchia sttilinus* (Hufn.). B, 1980.
- Maniola jurtina* (L.) *hispulla* Esp. N, common; M; DG; R; R(W), one female *semialba* Bdv.; G, in Mon Repos gardens; B.
- Pyronia cecilia* (Vall.). N, on coast towards Lefkimo, June; M, few, worn; R(P), 27.v/12.vi.1895, many; G, 4/10.vii.1925, rare, six only.
- Coenonympha pamphilus* (L.). M, "an interesting dark form"; DG, var. *lyllus* Esp.; R(P), large female of type form, 4.vi.1895; R, var. *lyllus*, many; G, f. *marginata*, abundant and variable; L, Corfu outskirts, 23.iv.1977, undersides in both sexes almost unicolorous; B, 1980.
- Pararge aegeria* (L.). N, in the park; M, King's park, common, both f. *egeria* and f. *egerides*; R, Achilleon park, var. *intermedia* Tutt; G, Mon Repos gardens, transitional forms; L, Paleokastritza, not common; B, 1980.
- Lasiommata megera* (L.). N, in May, scarce, R, Achilleon park, R(RW), October specimens "golden red, underside not lighter, var. *megaerina* H-S"; G, f. *lyssa* Bdv., very uncommon; G(F), Mt. Aghia Deka, 6.v; L, Paleokastritza 19.iv.1977, few; B, 1980.
- L. maera* (L.). M, scarce in May; G, very uncommon, f. *orientalis* Stgr.; B, 1980.
- Kirinia roxelana* (Cramer). S(E); M, few, worn; DG, 22/27.v; R, Achilleon park 5.vii; G, males worn, females fresh; B, 1980. N, common on hill-sides, settling on olive trunks and rocks, with *S. hermione*; B, 1980.
- Spialia orbifer* (Hübner). N, fairly common in May.
- Syrichthys proto* (Ochs). M, on Vido Island 21/29.ix.1897, six only; B, 1980.
- Carcharodus alceae* (Esp.). N, not common, May; M, common; G, f. *australis*, one worn; B, 1980.

[*C. flocciferus* (Zell.). S. says "Erber found on Corfu almost typical *marrubii* Rambur (*floccifera* Zell.)". *Marrubii* Rambur, now known as *boeticus* Rambur, is a south west European species distinct from *flocciferus*, which on the Greek mainland flies only on mountains above about 1,000 m., being replaced at lower levels by the next species, to which Erber's specimens may have belonged.]

C. orientalis (Rev.). Known privately to C. to exist in Corfu; but the first published record appears to be that of B., 1980.

[*Erynnis tages* (L.). S(E); not otherwise reported. In view of possible confusion with the next species, confirmation is required. The species is widespread on the mainland of Greece and Albania.]

E. marloyi (Bdv.). N.. Mt. Pylides in May, rare; L., on summit of Mt. Pantokrator 29.4.1977, one on stony ground.

Thymelicus actaeon (Rott.). S(E); DG., 22/27.v.1899; R(P), 11.vi.1895, G., in several places, worn, 4/9.vii.1925.

T. flavus (Brunnich). N., as *Hesperia thaumas*, fairly common but local; R(P), 9.vi.1895, both sexes large; G., Benitza, 7.vii.1925, one worn.

Ochlodes venata (Bremer & Grey). N., fairly common, but local; DG., 22/27.v.1899.

[*Gegenes nostrodamus* (F.). S. says "*Hesperia pumilio* Hübn. (*nostrodamus* Rambur ? F.) . . . also on Corfu, everywhere scarce"; M., "*H. nostrodamus*, one or two taken on Vido" 21/28.ix.1897. As the differences between the two species were not then clearly recognised, these records may refer to either; both occur on the Greek mainland.]

Gegenes pumilio (Hffsgg.). B., 1980, first confirmed record for Corfu.

Of the 79 species of butterflies (Rhopalocera) listed above, 16 have been placed within square brackets as requiring confirmation either of actual occurrence in Corfu or of identification. Nine others appear not to have been reported in the present century, though there is no reason to doubt the earlier records. The list is unlikely to be complete; but even so, probably more species of Rhopalocera are to be found in Corfu than in any other Mediterranean island except Sicily.

Note. Since this list was prepared, an article published by L. Willemse, 1981, "More about the distribution of Lepidoptera (Rhopalocera) in Greece" (*Ent. Bericht.* 41: 41-48) contains records of some 20 species of butterflies seen by him in Corfu from July 17-19, 1976. These do not add any species to the list above; but they include a mention of *Tarucus balkanicus* (Freyer) at Yimerion, 50 m, 17.vii.1976. This should therefore replace that by Baldock, 1980, as the first published record of that species in Corfu.

LEPIDOPTERA IMMIGRANT TO ORKNEY IN 1980

by R.I. LORIMER

Scorradale, Orphir, Orkney

Regular sampling by mercury vapour light was carried out at Scorradale, Orphir, Orkney from 14-29.iv and from 22.v-12.ix.1980, thus covering the greater part of the short entomological season in the far north of Great Britain.

That migrant activity can extend thus far north quite early in the year is shown by the occurrence of a very pale male *Agrotis ipsilon* (Hufn.) on 16.iv, but unfortunately no meteorological data were recorded at the time.

During the second visit there were strong indications of three distinct waves of immigration.

On 5.vi there was a severe thunderstorm in mid-morning; thunder is rare in Orkney and does not occur by any means every year and Mr. R. F. Bretherton has kindly checked the relevant weather maps and finds that the air-mass which caused the turbulence was southern and western in origin. By the evening of 5.vi *Plutella xylostella* (L.), *Vanessa atalanta* (L.) and *Cynthia cardui* (L.) were present in numbers throughout the Islands. On the morning of 6.vi the traps contained several *A. ipsilon* and *Autographa gamma* (L.), two *Blepharita adusta* (Esper) of the typical form (Orkney specimens are normally of the dark ab. *duplex* (Haw.) and two fresh *Lacanobia biren* (Goeze) black in ground colour, with greatly reduced pale markings and quite unlike normal Orkney specimens which had, in any case, been over for about a fortnight. Mr. A. H. Hayes of the Department of Entomology, B.M.N.H. went to considerable trouble to trace similar specimens in the collections and, although there were none so dark, those from the southern half of Europe approximate more closely to mine than those from further north. The figure of ab. *aperta* Hübner (Seitz, 1914, pl. 17, line d), although more brownish-black, is not dissimilar. During the following few days *Nomophila noctuella* (D. & S.) also arrived.

A second period of immigration was again heralded by a violent thunderstorm with torrential rain on 26.vii, but was apparently of different origin. After the storm, barometric pressure rose rapidly and remained steadily high for about a week, giving very light winds from south-east to east and "haar" along the eastern coast. *A. gamma* and *P. xylostella* arrived on 27.vii and the latter species built up so quickly in numbers that by 1.viii there must have been millions, with twenty or so disturbed by every step among the heather. It is fortunate that this very large immigration of *P. xylostella* came too late in the year to do much harm to *Brassica* crops, but it is possible that enough will manage to overwinter on *Cochlearia* on the coasts and *Hesperis* in gardens to cause problems early in 1981. From 31.vii two species of *Yponomeuta* arrived – numerous *Y. evonymella* (L.) and rather less *Y. padella* (L.) (of the white forewing form), both of which were to be seen (rather incongruously) sitting high up on heather and coming at night to mercury vapour light. Other unusual arrivals were 2 *Spaelotis ravidia* (D. & S.), 10 *Cosmia trapezina* (L.) (one ten miles away at Bellfield, St. Ola – S. V. Gauld), 1 *Idaea biselata* (Hufnagel), and 6 *Parastichtis suspecta* (Hübner). Although this last species is not usually considered to be immigrant, both occasions on which it has been recorded in Orkney were during periods of immigration from the east. In 1977 it was accompanied by *Syngrapha interrogationis* (L.) of the Scandinavian race and numerous pale *Eurois occulta* (L.) and it is suggested that here may lie an explanation of the species' occasional, but extreme fluctuations in abundance in the northern counties of England (Barrett, 1899: 305-306).

The fine weather broke about 17.viii and was followed by a week of cold, windy weather during which the wind never fell below force 8 and stayed in a

northerly quarter. After this the weather never settled completely, as a series of shallow depressions passed around a "high" to the south.

Unusual species still continued to arrive, although singly rather than in numbers: *Orthonama obstipata* (F.) (27.viii), *Udea ferrugalis* (Hübner) (7.ix) and *Zeiraphera diniana* (Guenée) of which five were captured during the first week of September, although the food plant is absent from Orkney, except for single trees in gardens.

The full list of species recorded may be found in Lorimer (1970 and 1977) with a further supplement in press and suggests that most of at least the "macrolepidoptera" have now been recorded, and that it is imprudent to reject any of the old records, however improbable, as there is a constant influx often from distant areas and that from time to time some of these newcomers become temporarily resident (e.g. *Discestra trifolii* (Hufn.)) or even established and common (e.g. *Scotopteryx chenopodiata* (L.)). To forestall future misgivings, voucher specimens of species newly recorded in Orkney are deposited regularly in British Museum (Natural History).

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ON REARING THE SPANISH FRITILLARY (*EURODRYAS DESFONTAINII* GODART — LEP: NYMPHALIDAE)

by R. F. BRETHERTON

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The Spanish Fritillary, *Eurodryas desfontainii*, which is closely related to the Marsh Fritillary (*E. aurinia* Rott.), is only known from scattered localities in the mountains of Morocco, Spain, Portugal, and the extreme south east of France. A very full account of the life history of the Moroccan sub-species, *gibrati* Oberthür, was made by Powell and published by Oberthür (1922); but I am not aware of any detailed account of the early stages of the three Spanish sub-species which are mentioned by Bustillo (1974), who does, however, list a number of kinds of *Centaurea* (Knapweeds) as their food plants.

In north Spain, thanks to the knowledge and skill of Mr. Peter Cribb, he and I were able to find on August 8, 1979, webs containing young larvae of the species, probably in their first or second instars, on damp, heathy ground at an altitude of about 1,200 m on the plateau north of Burgos. This is at or near the northern limit of *E. desfontainii* in Europe. The webs were spun round the stems and lower leaves of a small pink-flowered scabious, later tentatively identified as *Knautia integrifolia* Bertol, which does not occur in Britain. Each of the two webs which I brought home to England three days later contained some twenty larvae. They

were placed in muslin covered pots in the open, with remains of the original food and growing plants of devil's bit scabious (*Succisa pratensis*) which is the usual food of our British *E. aurinia aurinia*. Little further feeding was noticed before the winter. For this, in view of the severe winter climate of the Burgos plateau, it was thought best to leave the pots and larvae out of doors, though they were given some shelter from heavy rain under overhanging eaves of the house. The larvae soon disappeared from the webs and presumably hibernated in leaf debris and crevices in the soil.

This invisibility led me to assume that none had survived the winter; but on April 10, 1980, about a dozen active larvae were found in one of the pots, in which they had already completely stripped spring shoots of the scabious and were clearly then short of food. They were transferred to fresh plants of devil's bit and also of field scabious (*Knautia arvensis*) and small scabious (*Scabiosa columbaria*) to which were later added sprays of garden honeysuckle (*Lonicera caprifolium*). They continued to eat some of the devil's bit, but showed some preference for the honeysuckle; the other plants were ignored. Hot sunshine and high day temperatures appeared to be necessary for their growth and especially for successful moulting, and some fed up quickly during the short spells of these in mid April and May: five were in their last instar by May 10 and pupated between 15 and 17, and the sixth did so on 26. The others grew intermittently and died off at various sizes before the last instar, although two were still alive when the first imago emerged on June 4. It seems likely that their failure to reach maturity was more due to lack of Spanish sunshine than the unusual food plants.

Of the pupae, four were suspended from silken pads on the muslin cover, and two on stems of honeysuckle. These, too, seemed to require hot sunshine to provoke emergence of the imagines, which took place between 10.30 a.m. and noon (B.S.T.). An unexpected feature was that the first four, on June 4, 6 (two), and 12, were all females; the only male emerged on 13th, and the laggard pupa gave another female on 17th. I feared that this male tardiness might make it impossible to get a pairing; but in fact the male paired readily for several hours in the late afternoon of 13th, with the first female, which had emerged nine days earlier with a slightly deformed forewing. During the next few days she laid two large flat patches of eggs, about 170 in all, low down on a single leaf of devil's bit. The eggs were yellowish cream when laid, but soon about half became bright reddish orange; the remainder have shown no colour change and are presumably infertile. The male refused to pair again, either with his previous partner or with two other females which had emerged before and after him despite frequent invitations from them, so after a week he was killed and set for the collection, still in very fair condition. The butterflies were provided throughout with freshly cut thyme blossom, on which they rested and fed freely. The fertilised female survived until 6th July, after a life of 31 days, of which more than half were after she had completed her egg laying. Most of July in England was, however, wet, cold and sunless; and her eggs failed to hatch.

Unfortunately I had no larvae of *E. aurinia* available for comparison. However, reference to the descriptions and colour figures in Frohawk (1934) suggests that the larvae of *E. desfontainii* in their early instars have a browner tinge than those of *E. aurinia*; in their final instar they are markedly larger, and have the white markings more pronounced, especially those which Frohawk calls the "floral decorations" round the spiracles; and these contrast sharply with intensely black ground colour. The web must play a smaller part in their life history, since it apparently does not serve as a hibernaculum or as a base in early spring, as is the case with *E. aurinia*. The pupae are more squat in shape, and have the orange and black markings stronger and more conspicuous. The imagines in both sexes are larger, with a much brighter reddish ground colour than British *E. aurinia aurinia*, and have clear pale blue lunules round the margin of the hindwings. On

the upper side they strongly resemble *E. aurinia beckeri* Herrich-Schaeffer from southern Spain; but on the underside they are easily distinguished by the heavy black markings in the centre of the forewing, which stretch from the costa to the inner margin.

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BOOK REVIEW

A Field Guide to the Butterflies of Britain and Europe, by L.G. Higgins and N.D. Riley. Fourth edition, revised and reset. Collins, London, 1980. 387 pp., 63 coloured plates and 384 distribution maps. £7.95.

This Field Guide is known to many thousands of readers since it was published in 1970. It has translations in eight foreign languages, and now there is a fourth English edition, which incorporates many changes and improvements both in format and substance. The dust cover has been replaced by a fine cover of white cloth with coloured pictures of butterflies on flowers and grasses. The colour plates are now grouped together, making reference much easier; and three new plates include most of the species added since the first edition. There is now a complete alphabetical index of the scientific names of families, genera, species, subspecies and forms referred to in the text. Some 60 distribution maps have been corrected in the light of more recent information.

The area covered is, as before, the British Isles, most of Europe, and North Africa, including the Canary islands and the Azores but, rather unhappily, not Cyprus or the Greek islands of the eastern Aegean. The text, and the check list which is still regrettably without authors' names, now shows 395 species as compared with 378 in the first edition. As explained in the preface, some of the additions result from recent discoveries in the area, while others are promotions from subspecific rank; there are also some demotions to that rank. In most cases where there are differences in expert opinion about where this taxonomic line should be drawn, this is stated in the text. Changes in specific names are blessedly few: one may hope that stability in this has been almost reached. The confusing reversal in the text of the names of *Euchloë ausonia* and *E. simplonia* (the Dappled Whites) has, since publication, been formally withdrawn by a note in *Entomologist's Gazette* (1980) 31: 246. A number of other taxa, some of them new, have been added as subspecies, and others as geographical forms; but in general the authors' perhaps over rigorous caution in the award of subspecific rank has been maintained. There are, however, considerable changes resulting from splitting several previously established genera and from changing the species content of others; and the order of the families and the arrangement of some of the genera within them have also been drastically altered. The need for the creation of some of this further instability is not always obvious, and it will be regarded by many field workers and collectors as unfortunate.

Nevertheless, the Field Guide was originally good, and this fourth edition is welcome and indispensable. It is much to be regretted that the second author, N.D. Riley, is no longer with us to see it.

R.F.B.

NEW LOCALITY AND HOST PLANT RECORDS OF *AMBLYPelta* SPP. (HEMIPTERA, COREIDAE) WITH NOTES ON EARLY STUDIES

by R. A. LEVER

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The genus *Amblypelta* was erected by Stål (1873) to receive two species from Caledonia and Vanuata (New Hebrides). Sixty years elapsed before a third species was described from coconut in the Solomon Islands (China 1934). A detailed revision of the genus by Brown (1958, 1959) is herewith supplemented with additional locality and host-plants records, all but one of the 13 described species now having recorded hosts. An account is also given showing how inadequate field data by a succession of workers led to tardy recognition of the agent responsible for serious damage to coconut.

LOCALITIES AND HOST-RECORDS

Amblypelta ardleyi Brown; Later studies by Szent-Ivany (1961) on pests of Cacao (cocoa) in Papua New Guinea show that pods of cacao are attacked in Morobe Province.

A. bilineata Stål: No additional hosts to *Schinus terebinthifolius* are known. Dr. J. Carayon of the Muséum National d'Histoire Naturelle, Paris kindly checked material in that collection. This is the most southerly species, occurring in New Caledonia and Vanuatu.

A. blötei Brown: Recorded (locality data only) from Irian Jaya (West Irian). Dr. P.H. van Doesburg of the Rijksmuseum van Natuurlijke Historie, Leiden has checked labels for food-plant records.

A. brevicornis Brown: The following food-plants have been supplied by Mr. J.F. Donaldson, Department of Primary Industry, Indooroopilly Queensland – *Citrus*, olive, *Geijera parviflora* and *Melaleuca*. Besides Queensland and New South Wales, it is also known from the Northern Territory.

A. cocophaga Brown: With its subspecies *c. malaitensis* Brown, occurs throughout the Solomon Islands including Bougainville. An extensive list of cultivated and jungle plants has been recorded as hosts. Notes on the bionomics of this species are given below.

Three species of *Eucalyptus* in the Solomon Islands have recently been found affected with shoot-tip necrosis (Macfarlane, Jackson and Marten).

A. costalis Van Duzee: Three subspecies known, two from the minute Rennell and Bellona Islands in the Solomons and the third extending to Papua New Guinea and the Bismarck archipelago. Cassava, cacao and rubber are food-plants.

A. cristobalensis Brown: Confined to San Cristobal in the Solomons with records from coconut and cassava.

A. gallegonis Lever: The nominate subspecies restricted to Isabel, the subspecies *g. bougainvillensis* Brown occurring over a wide area in the western Solomons and Bougainville. Cassava and sweet potato, pepper and *Pueraria phaseoloides*.

A. lutescens (Dist.): records of the nominate subspecies in Queensland, Northern Territory, Banks and Kai Island and *l. papuensis* Brown in Papua New Guinea are as cited by Brown. Additional host plants are guava, mulberry, *Codiaeum* and *Malpighia*.

A. manihotis (Blöte): known only from Java, the most westerly point of the distribution of the genus. Cassava and *Albizia*.

A. nitida Stål: Mr. Donaldson extends the range from south of Sydney, N.S.W. through Queensland towards the tip of Cape York and inland to the Carnarvon Range. He also expands Brown's host plant records of *Prunus* spp. to include apple, avocado, citrus, custard apple, guava, *Macadamia*, mango, *Passiflora* and pecan nut.

A. madangana Brown & Ghauri: This is the most recently described species (1961) which was later recorded from cacao pods (Szent-Ivany 1963). It has been taken in Madang and Port Moresby.

A. theobromae Brown: as shown by Brown, this species occurs up to 1,500 ft. in Papua New Guinea. Besides cacao, it feeds on cassava and rubber.

A. sp. An undescribed species from the Central District, Papua New Guinea is known to Dr. M.S.K. Ghauri who informs me it damages cacao pods.

EARLY FIELD WORK IN RELATION TO BIONOMICS

The manner in which the habits of *A. cocophaga* influenced the conclusions of field workers dealing with immature or premature nutfall has not been adequately described. The adults readily take to flight at the least disturbance, rarely feed in wet or overcast conditions and have such a low population density in the coconut plantations as to occur at less than one individual per palm. The nymphs are similarly elusive as they readily drop from the substratum and feed mainly under bright conditions. It was due to the retiring habits of these insects effectively eluding early investigators, coupled with their scarcity or even absence in the spadix of the palm, that progress in finding the causal agent was so slow.

The reports of Froggatt (1914), Simmonds (1925), Tothill (1929) and Lever (1933) all drew attention to the more abundant and sluggish pentatomid *Axiagastus cambelli* Dist. but all failed to mention *Amblypelta cocophaga* in the Solomons and New Guinea area as did Risbec (1934, 1937) and Williams (1944) in the New Hebrides and New Caledonia. Even after *Amblypelta* had been recorded as present in coconut spadices (Pagden & Lever, 1935) its responsibility for severe injury to young nuts was recognised only later (Lever 1935) owing to its presence at such a very low level. The fact that one or two insects, each making a single feeding puncture, could result weeks later in extensive lesions or gummosis was not appreciated.

The writer is fortunate in having had the opportunity to submit the above information to Mr. R.W. Paine (the late Dr. Tothill's assistant in the Solomon Islands survey of 1929), who agrees that the position regarding nutfall at that time was as described.

Unknown to all these workers in the Western Pacific, it transpired that a similar problem was being investigated at the same time in East Africa. The characteristic gummosis and nutfall was described by Welsford (1925, 1927) but it was not until 1950 that the causal insect was recognised (Briant 1952). This was later described as *Pseudotheraptus wayi* Brown and shown to have identical habits and similar ant associations as its opposite number in the Solomons. The combination of very low populations in the palms, elusive habits and delayed symptoms of damage after feeding by the nymphs and adults resulted in failure to isolate the responsible pest.

Recently an undescribed species of *Paradasynus*, a genus closely related to the above two genera, has been reported from coconut and other crops in India (Kurian *et al.* 1976). Typical gummosis of young nuts was found besides attacks on cashew, guava, mango, rubber and tapioca. Presumably this coreid moved in from the jungles of Karnataka and Kerala in the same way that *A. cocophaga* did in the Solomons when extensive coconut plantations were first opened up some 75 years ago. The above authors cite the Solomon islands species as occurring in "most islands of South China" which is erroneous as it is absent from Asia.

ACKNOWLEDGEMENTS

The writer wishes to thank Dr. M.S.K. Ghauri of the Commonwealth Institute of Entomology for helpful discussion on these coreids as well as to the gentlemen already mentioned under localities and host-plants. Dr. J.H.H. Svent-Ivany of the Adelaide Museum and Mr. E.S.C. Smith, Department of Primary Industry, Keravat, Papua New Guinea have also kindly supplied information on recent records in the field.

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INDOOR MEETINGS

JOINT MEETING WITH THE ROYAL ENTOMOLOGICAL SOCIETY

at 41 Queen's Gate, 17th December 1980

Three speakers gave talks on the general theme of insect-insect relationships to a large audience of fellows and members of the two Societies. Dr. V. Eastop of the British Museum (Natural History) gave a talk entitled "The Host with the Most", during which the effects of host plants on the distribution and ecology of

predators of plant feeding insects were discussed. C. Godfrey from Imperial College then spoke on the parasite fauna of leaf-mining insects, particularly Lepidoptera and Diptera. Finally, Dr. I. McLean of the Nature Conservancy Council examined some aspects of the life-history strategies of aphidophagous insects.

The lectures were followed by a lively discussion and this was continued over light refreshments in the library.

15th January 1981

The President, Mr. R. FAIRCLOUGH, in the chair.

COMMUNICATIONS

Mr. C. O'TOOLE stated that the use of naphthalene and para-dichlorobenzene in the insect collections at Oxford University had been discontinued by reason of their carcinogenic properties.

The President reported that in the mild spell of weather 21-27.xii.80 he had found *Phigalia pilosaria* (D. & S.) commonly at Leigh, Surrey.

Mr. E. H. WILD reported that Mr. B. SKINNER had told him of substantial numbers of *Theria rupicaprararia* (D. & S.) and *Erannis marginaria* (F.) in Epping Forest on 27.xii.80.

Mr. M. HADLEY stated that he had observed *Erannis leucophaearia* (D. & S.) in the same period.

Prof. J. OWEN reported that he had found *Polygonia c-album* (L.) hibernating in a hospital at Tooting, London, during December 1979. He thought it unusual for this butterfly to hibernate indoors. Prof. Owen also reported seeing a larva of *Pieris brassicae* (L.) pupate on 24.xii.80.

Mr. C. O'TOOLE lectured on Man, Bees and Conservation, with excellent slide illustrations.

29th January 1981

The President, Mr. R. FAIRCLOUGH, in the chair.

EXHIBITS

The President exhibited a fine set of illustrations of the varieties of *Acleris cristana* (D. & S.), painted by Mr R. Dyke.

Mr G. PRIOR exhibited *Phigalia pilosaria* (D. & S.), found on a window in Piccadilly, London on 21.i.81 and *Conistra vaccinii* L. from a window in another busy thoroughfare, Northolt Road, S. Harrow on 29.i.81.

MEMBERSHIP

Mrs S.J. Mansfield, Dr N.J. Mills, Messrs J. Briggs, R.F. McCormick, M.N. McCrae, R.T. Smith, M.R. Spurrell, A.J. Winters and L. Young were elected.

The deaths were announced of Mr D.L. Coates and Mr Austin Richardson.

ANNUAL GENERAL MEETING

The Officers' reports appear in parts 1-2 of the Proceedings and the list of new Officers and Council is on the cover of that issue.

Hon. Auditors for 1981: Mr A. Pickles on behalf of Council and Mr Bell on behalf of members.

Mr S.N.A. Jacobs proposed a vote of thanks to the retiring Officers and Council, which was carried with acclaim.

The President gave his address and then inducted the new President, Mr A. Stubbs, to the Chair.

12th February 1981

The President, Mr. A. STUBBS, in the chair.

The President announced the death of Mr. F. V. L. Jarvis, the well-known specialist on the genus *Aricia* (Lep.: Lycaenidae).

EXHIBITS

Dr. A. A. ALLEN (a) A female *Aleiodes tristis* Wesmael (Hym.: Braconidae), bred 12.viii.1980 from an Hesperiid larva swept from herbage in a lane at Shaldon, Devon. *A. tristis* is a known parasite of Hesperidae (and perhaps Satyridae), but appears to be uncommon.

(b) A female specimen of the ubiquitous *Pimpla instigator* F. (Hym.: Ichneumonidae), bred 23.xi.1980 from a pupa of *Aglais urticae* by Flying Officer J. M. Guthrie. The exhibit is of interest in that the parent ♀ *P. instigator* must have gained access to the pupa in captivity, for the parasites attack only pupae, and the host larva which came from Hertfordshire was feral. *P. instigator* is a large insect and the exhibit served as a warning to breeders to ensure that their stock was well protected from such predators.

COMMUNICATIONS

The President drew attention to "Butterfly Year" starting 13th May 1981, the objectives of which are: (1) to promote awareness of butterflies (and other insects) as being worthy of conservation; (ii) To investigate further measures for the safeguard and management of important butterfly sites, including acquisition of reserves; (iii) To create a public awareness of butterflies as an indication of the health of the wildlife of town and county; (iv) To promote awareness among the public, and particularly children, of the interdependence of butterflies and other animals, plants in the habitat; (v) To raise funds to help achieve the above objectives.

The President furthermore alluded to the NCC press release to demonstrate the need for firm site protection as the new Wildlife Bill goes through parliament. He added that in 1980, on average 10% of the S.S.S.I.s in 20 English counties were lost or severely damaged, and amounting to 32% in Dorset and 17% in Northamptonshire.

Mr. PRIOR reported that the late Mr. Cyril Hammond's bequest of his books, collection and entomological apparatus were now with the Society.

Lt. Col. A. M. EMMET stated that Monsieur P. Leraut requested British specimens of Scopariinae in exchange for *Liste Systematique et Synonymique des Lepidopteres de France, Belgique et Corse* of which he was the author. Those interested to communicate with Col. Emmet.

Then followed a most interesting talk entitled "Peru, 1979", given by Mr. M. W. F. Tweedie, and accompanied by a series of beautiful slides.

26th March 1981

The President, Mr A.E. STUBBS, in the Chair.

The President welcomed Mr I. Svensson, from Sweden.

EXHIBITS

Mr M. BROWN exhibited five larvae of *Epirrita autumnata* Bork. ex ova from a female taken at light at Chobham, Surrey.

Mr K.G.W. EVANS showed two *Helicoverpa armigera armigera* Hübner

(Scarce Bordered Straw). The first was reared 21.i.80 from a larva found 1.xii.79 in a tomato at Addiscombe, Surrey and originating from Las Palmas, Canary Is. The second was taken at mercury vapour light 22.x.77 at Addiscombe.

MEMBERSHIP AND ANNOUNCEMENT

Mr J.C. Christie was elected to membership.

Dr J. BADMIN invited members to the field meetings of the Kent Field Club.

COMMUNICATIONS

Mr R.F. BRETHERTON reported further arrivals of the migrant moth *Agrotis ipsilon* Hufn., including 12 examples recorded by Mr J.A.C. GREENWOOD on or about 11th March in W. Sussex. Mr Bretherton asked for further records of this and other migrants. Mr J.M. CHALMERS-HUNT reported that Mr R.A. SOFTLY had recorded this moth recently from Hampstead.

Col A.M. EMMET said that Mr Greenwood had also recorded the arrival of *Nomophila noctuella* (D. & S.).

Mr CHALMERS-HUNT had seen a female Brimstone (*G. rhamni* (L.)) on 20.iii.81.

Mr E.G. PHILP described 'The Kent Biological Records Centre, its evolution and function'. The many questions at the end indicated the interest which this subject had aroused.

9th April 1981

The President, Mr. A.E. STUBBS, in the Chair.

The President reported the deaths of Mr W.H. Spreadbury and Mr R.R. Pickering.

EXHIBITS

Mr G. PRIOR showed larvae of *Eupithecia tenuiata* (Hübner) (The Slender Pug) taken from canal banks at Oxford feeding on the female catkins of *Salix caprea*. The larvae were probably in the third instar. Mr K.G.W. EVANS showed a specimen of *Antichloris eriphia* (F.) (Ctenuchidae). This adult moth emerged from a crate of bananas from Ecuador and was found at Addiscombe, Surrey 19.i.81. It is the first British record. Mr Evans had traced the firm of banana ripeners through whose hands the fruit had passed and discovered that the bananas had been subjected for several days to a high concentration of ethylene, this without ill-effect to the moth, which presumably was then in the pupal state.

COMMUNICATIONS

Mr BRETHERTON drew attention to a very early season. He reported that his moth trap at Bramley, Surrey had attracted over 220 moths on the previous night against 40-48 a year ago. Among the 19 species of the Macro-lepidoptera were *Odontotia carmelita* (Esper) and *Polyplocia ridens* (Fab.), being about 14 days earlier than usual.

Mr E.H. WILD reported finding *Acleris literana* (L.) at Selsdon, Surrey.

Mr S.N.A. JACOBS had noticed one of the Plume moths, *Emmelina monodactyla* (L.) on a fence and one week later it was still in the same position.

Mrs MONIQUE SIMMONDS gave an interesting lecture on "Parasitoid Host Interactions".

23rd April 1981

The President, Mr A.E. STUBBS, in the Chair.

EXHIBITS

Mr E.H. WILD showed a set specimen of *Orthosia gothica* (L.) var. *pallida-rufescens-reducta* from Selsdon, Surrey.

Mr A.J. HALSTEAD showed some live adults of the Scarlet Lily Beetle, *Lilocenys lili* (Scop.) (Col: Chrysomelidae) collected from the Royal Horticultural Society's Gardens, Wisley, Surrey. This beetle is not native to Britain but became established during the early 1940s. It remains confined mainly to Surrey, Hampshire and Berkshire, where it is a pest of lilies and crown imperial fritillaries. Both larvae and adults feed on the foliage, flowers and seed capsules.

Mr. DUGDALE showed some slides of larvae of *Micropterix calthella* (L.) and *M. aruncella* (Scop.) (Lep: Micropterigidae), the former from Silwood Park and the latter from Box Hill, Surrey.

MEMBERSHIP AND ANNOUNCEMENT

Mr N.J. Derry and Mr C.H. Brandstetter were elected.

Mr R.F. BRETHERTON stated that he was now issuing the paperback edition of the *Identification Guide to British Pugs*.

COMMUNICATIONS

Mr J.M. CHALMERS-HUNT had taken a fully melanic form of *Polyphlocia ridens* (F.) 16.iv.81. From the R.C.K. collection this form is ab. *fumosa* Warnecke. Mr R. FAIRCLOUGH commented that at Leigh, Surrey *P. ridens* tended to be very dark, whereas in other localities the moth was normally green.

Mr DAVID YENDALL lectured on "Australian Insects and Spiders", accompanied by approx. 160 slides.

14th May 1981

The President, Mr A.E. STUBBS, in the Chair.

EXHIBITS

Mr R. FAIRCLOUGH: (i) a parasite on the larger woodwasps, determined at the BM(NH) as *Rhyssa* (?) *persuasoria*, one of four found indoors by a neighbour. There had been logs in the room. (ii) live examples of *Micropterix mansuetella* Zeller with two *M. calthella* (L.) for comparison. The *mansuetella* are black-headed. They were caught in the Kennet Valley, Berkshire on 12.v.81 feeding together on *Caltha palustris*.

Mr G. PRIOR showed larvae of *Eupithecia pusillata* (D. & S.), the Juniper Pug, taken from *Juniperus communis* and reared on *Cupressus* spp. They do as well on the cypress as upon their original food plant and the specimens taken in urban areas may feed on the various cypresses that now proliferate there. A similar Juniper-feeding pug, *E. intricata arceuthata* (Freyer) can now be quite commonly beaten out of species of cypress in suburban areas.

Mr I.R. HUDSON: (i) two *Polysphinctini* (Hym: Ichneumonidae) bred from larvae found on spider hosts of family Clubionidae. These were found in hollow stems of last year's Cow Parsley, growing in woodland near Portsmouth, Hants. These are ectoparasites and when still tiny the spider has mobility, albeit sluggish. Larval development takes approx. 5 days from 1 mm-7 mm. Adult emerges 11-14 days after pupation. All larvae found late March-early April; (ii) a Cryptine

Ichneumonid bred from pupa of *Triarthria* sp. (Dip: Tachinidae) found amongst earwig remains in hollow stems from same location as above. All pupae found late March-early April; adult hosts and parasites emerged during late April.

Mr C. HART showed two larvae, one last instar, of *Boloria selene*, Small Pearl Bordered Fritillary, which were reared from ova laid by a female caught in Cornwall. Also fully fed larvae of *Chloroclystis debiliata*, Bilberry Pug, which were obtained on 9.v.81 at Friday Street, Surrey.

COMMUNICATIONS

Mr E.H. WILD reported that some migration was in progress as he had 5 examples of *Plutella xylostella* (L.) (Lep: Plutellinae) in his Selsdon, Surrey trap on 12.v.81.

Mr J. HEATH reported great quantities of *Callophrys rubi* (L.), Green Hairstreak, in the Lake District on 16.iv.81.

Mr R.F. BRETHERTON reported that up to 13.v.81 no less than 71 species had arrived at his Bramley, Surrey trap. This was a record. However, they came in ones and twos and there were no large numbers. Mr G. PRIOR complained that only a few moths had been arriving at his North Harrow, Middlesex trap and the last two nights had produced only four and four respectively.

The PRESIDENT stated that the commencement of the "Butterfly Year" was timed to coincide with the issue by the Post Office on 13th May 1981 of a series of butterfly stamps. The British Butterfly Conservation Society planned to play a leading role in organising the Butterfly Year. He also reported that the privately owned Moccas Park is now a National Nature Reserve.

Col N. CLAYDEN then gave a most interesting lecture entitled "Conservation at work in the Ministry of Defence" which was enthusiastically received by the members. At the conclusion of the lecture Col. Clayden cordially invited members to approach him for permits to enter M.O.D. sites for the purpose of collecting and recording. Within the limits imposed by safety and security every assistance would be given.

28th May 1981

The President, Mr A.E. STUBBS, in the Chair.

EXHIBITS

The President remarked that hawthorn flowers exhibited on the wild plants table at Kew Gardens had buds which fell off and leapt across the table in jumps of up to half a centimetre at a time. Four buds were exhibited plus a preserved larva which seemed to be hymenopterous. Members were asked if they knew what this insect might be.

Mr R. FAIRCLOUGH showed a specimen of *Enarmonia formosana* (Scop.) (Lep: Tortricidae) with some of the larval workings in ornamental crab bark from Loughton, Essex.

Dr A.A. ALLEN: (i) two rare *Phaeogenini* (Hym: Ichneumonidae) both bred from microlepidopterous pupae found on pine needles—*Pinus sylvestris*. The first of these, *Eriplatys ardeicollis* (Wesmael), was bred 16.vi.79 from a pupa, initially alive, found on Reigate Heath, Surrey 20.v.79. The second, *Herpestomus wesmaeli* Perkins, was bred vi.1980 from a pupa taken on Brownsea Island, Dorset 30.v.1980. A similar pupa nearby yielded a specimen of *Cedestis subfasciella* (Stephens) (Lep., Yponomeutidae). (ii) larvae of two species of Lepidoptera both taken 23.v.1981 at Brownsea Island, Dorset: *Lithophane leautieri* (Boisduval) (Lep., Noctuidae) beaten from *Cupressus macrocarpa* Gord. and *Luffia ferchaultella*

(Stephens) (Lep: Psychidae), the latter numerous on lichen-covered bamboo canes.

Col A.M. EMMET described in detail variation in two species of *Phyllonorycter* (Lep.): (i) *Phyllonorycter stettinensis* (Nicelli). Normally the head has the frons white and the vertex and collar black. The two specimens shown were reared from Pods Wood, near Tiptree, Essex in April 1981. In one the colour of the frons and vertex is interchanged i.e. the frons is black and the vertex clear, shining white, the collar, however, is black as usual. The other specimen, which was shown for comparison, is normal. (ii) *Phyllonorycter salicicolella* (Sircom). Typical specimens have a wingspan of 8-10 mm, the ground colour golden ochreous and the pattern clearly defined. Specimens reared from *Salix aurita* are usually much smaller (wingspan 5-7 mm), the ground colour pale fawn often heavily irrorate fuscous and the pattern relatively obscure. However, typical specimens also occur on this foodplant. Fifteen examples of the small form were shown, reared from Essex Hertfordshire, South Wales and Ireland. For comparison, eight typical examples reared from *Salix cinerea* were shown from Essex and Surrey, and five typical specimens reared from *Salix aurita* from Essex, the Isle of Man and Ireland. If the size was controlled by genetic factors, it is difficult to explain why the dwarfs occur on only one of the foodplants. The characteristics of *Salix aurita* can hardly be responsible since it also nurtures the large form and *Phyllonorycter spinolella* (Duponchel) shows no variation in size when reared from that foodplant. There is, therefore, a possibility that the dwarfs are a distinct species.

Mr R.A. SOFTLY showed larvae of *Odezia atrata* (L.) The Chimney Sweeper Moth from Hampstead Heath.

MEMBERSHIP AND ANNOUNCEMENT

Mr J.A. Miles and Dr M.C.D. Speight were elected.

The Curator said that two ten-drawer Hill units containing a large part of the Torstenius collection had been installed.

COMMUNICATIONS

Mr R.F. BRETHERTON reported that *Cynthia cardui* (L.) had been seen on 21.v.81.

Mr E. BRADFORD reported on the activity of a clothes moth which had caused considerable damage to a rolled-up Persian Carpet. The moth had damaged only one colour of the carpet presumably due to the nature of the dye used rather than any preference for colour.

Mr K. EVANS complained that the bad weather continued and that on the night of 23.v.81 his moth trap at Addiscombe, Surrey had failed to attract a single insect – a situation which he had never previously experienced at this time of year. Mr R.F. BRETHERTON concurred and maintained that his Bramley, Surrey trap was still only producing a few of each of the many species it was attracting.

Dr D.A. GRIFFITHS lectured on "Mites on Insects – Free board and lodging?" accompanied by slides, notably a series of pictures taken with the aid of a scanning electron microscope.

11th June 1981

A Vice-President, Mr John HEATH, in the Chair.

EXHIBITS

Mr G. PRIOR showed larvae of *Thera juniperata* (L.) (The Juniper Carpet Moth) found on a juniper bush in his garden in North Harrow. The juniper bush, brought from the Chilterns about eight years ago as a 20 cm shrub, was planted in

his garden of solid yellow clay. It has thrived and is now some 4 feet high. He stated that he had never taken the moth at light in his garden.

COMMUNICATIONS

Following Mr. Prior's exhibit there was some discussion regarding the decline of Juniper in the south of England. It was generally agreed that it had disappeared from a number of localities where it used to flourish.

Dr B. DAVIS lectured on "Some invertebrates of the Chelsea Physic Garden and Holland Park".

BOOK REVIEW

The Smaller Moths of Essex. A.M. Emmet. Essex Naturalist, no. 6. The Essex Field Club, London, 1981. pp. 158. £7 (single copies £5 to BENHS members).

The introduction to this book is comprehensive and puts it in excellent perspective. It is a monument to the pioneer work of the collectors of Stainton and Doubleday's era extended throughout the county by the industry of the Emmets. To appreciate what they have achieved to date, buy this book if you have the most casual interest in Essex or in local lists.

Distributions are summarised in a few lines in the text, supplemented by thumbnail-sized 10 km square maps at the bottom of the pages. It is essential that the author's records be deposited in an accessible place, because localities cannot be deduced from 10 km square maps, particularly when the Emmets are likely to have found the one hedge or roadside bank where an isolated colony of an insect persists. The Passmore Edwards Museum should hold a copy.

The text is also delightfully relieved by illustrations of characteristic members of each family at its head. Most of these are the superbly observed line drawings by E.S. Bradford, many reproduced from the A.E.S. *Bulletin*. The remainder are by E.P. Sayers, a newcomer to entomological illustration. These are less accurate and in some cases do not catch the characteristics of the species portrayed. They lack Bradford's knack of conveying colour pattern with contour and texture within the limits of a monochrome image. It is this that makes Bradford's tortricids so much more recognisable than the flatly illuminated photographic atlas published in the *Entomologist's Gazette* by Bradley. Sayers has no shading to show the tri-coloured pattern of *Coleophora conspicuella*. The larval case is unconvincing in texture and has sprouted whiskers (of mould?). The wings of *Cnaemidophorus rhododactyla* are broad, but these appear to have been expanded to match the reputation of this prize of Essex. Other drawings suggest that the author is rapidly improving his technique.

The book has been typeset very competently by its editor, David Corke. A few residual errors have been hand corrected before distribution in the review copy, but most of these are of no great consequence. There are one or two gaps where words are missing. An erratum slip would assist for these items. The sequence of the species is according to Kloet and Hincks and there is no index within the volume. The contents page gives adequate assistance by listing the families.

Emmet comments that all the principal collectors in Essex have been based around its perimeter and that no collector has regularly collected micro moths from a light trap. A fixed light trap is of restricted use in Essex because of the seriously dissected nature of the remnants of formerly widespread habitats. One needs a portable trap and the inclination to investigate every corner with it. Although I have lived on a notch in the western border of Essex since 1973 and for 18 months before that on the edge of Wintry Wood, Epping, I have collected very

little in Essex. The low abundance of insects in the western part of Essex, compared to the seaboard or the counties of Surrey, Kent and even West London, where I did all my earlier entomology, depressed me to the point of inactivity. Despite this, I see my records turning up frequently in the text as sole records for the district. In Little Hallingbury, only on the warmest nights do marsh species drift up from the River Stort half a mile away. On cool nights a light reveals only a grass moth and a garden noctuid or two in flight. The tall hedges are a barrier around the derelict field beyond. Had it not been for the summers of 1975/6 I would still have recorded only a fraction of the species that I have seen at home. It took *Leucoptera spartifoliella* five years to find the *Sarothamnus* growing in my garden; I have never had a coleophorid case on *Chenopodium*, though I did take a *C. versurella* at light this year. I would not know where to look for the headquarters of some of the casual species, e.g. the two *Catoptria falsella* that arrived in 1981. It is probable that all the species that Emmet has found in Hatfield Forest Marsh have come from the Stort Valley, but this remains to be proven. An example is *Adaina microdactyla*, one of which investigated the clump of *Eupatorium* in my garden, though I have never recognised the larvae in the marsh.

Emmet is justly proud of the total of 1,052 micro moths in his list, but I do not share the optimism that this engenders in him. With chalk habitat reduced to a few roadsides plus a pit and fresh marshes so reduced that he lauds the border of an artificial lake, in a county that boasted Swallowtail butterflies 200 years ago, I believe that Emmet has worked on this list just in time to record many species before their final demise.

R.W.J.U.

***Epermenia chaerophyllella* (Goeze) pairing.** — I am rearing this moth in September and note that they are to be found mating in the morning. Do both sexes overwinter? — R.W.J. Uffen.



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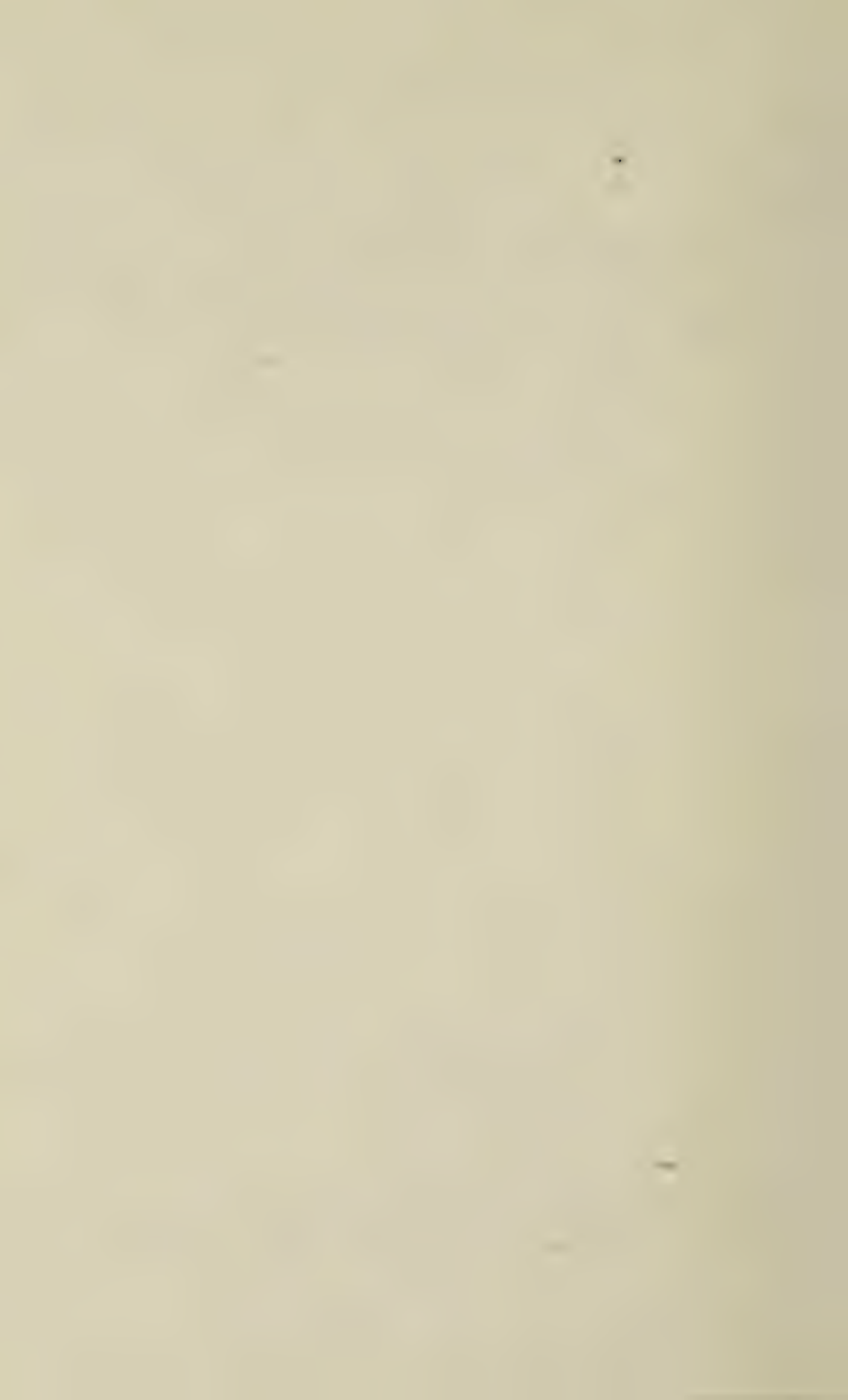
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OEGOCONIA CARADJAI POPESCU-GORJ & CĂPUȘE (LEP: GELECHIIDAE) RECOGNISED AS BRITISH

by D. J. L. AGASSIZ

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Black and ochreous moths of the genus *Oegoconia* are not unfamiliar to most students of microlepidoptera in England. They are attracted to light and are also found in hedgerows. For many years they were all assigned to *quadripuncta* (Haw.) until Goddard (1966) showed that more than one species was involved. Black moths with narrow yellow fasciae (very roughly speaking) were referable to *deauratella* (H.-S.) whilst the remainder having broader yellow fasciae remained known as *quadripuncta*. Goddard described the differences in the genitalia but as these were not illustrated I gave some figures in an article published in these Proceedings (Agassiz, 1980). In preparing that article I was puzzled that my findings appeared at first sight to contradict those of E.S. Bradford who showed me his unpublished drawings of the genitalia of *quadripuncta* and *deauratella*. During the years following two other workers raised questions: R. J. Heckford noticed differences in the shape of the saccus of males he dissected and J. R. Langmaid informed me that according to my drawings all his males were *quadripuncta* whilst all the females were *deauratella*! Clearly further research was required. Further dissections were made, a closer study followed and it became clear that we had a third species. When I had first dissected two females of different species I assumed, incorrectly, that the paler was *quadripuncta* and the darker *deauratella*; in fact the darker was *quadripuncta* and the paler one the new species.

By now I had associated females to the corresponding males. Many specimens in the collections of the British Museum (Natural History) had been dissected clearly showing the same three species to be present in other parts of Europe, North Africa and the Middle East. A paper by Popescu-Gorj & Căpușe (1965) identified the same three species in Rumania, although they had not seen the female of *caradjai*, our new species which was described there, nor had they considered Herrich-Schäffer's description of *deauratella*.

Superficially it is often possible to distinguish the species on wing pattern, but all vary and there are a good many doubtful specimens which need to be determined by genitalia examination. Generally *caradjai* is the species with the broadest yellow fasciae, especially the middle one which is broader on the dorsum. *O. deauratella* is the darkest species and is normally the easiest to separate. *O. quadripuncta* is intermediate between these two, but it is also of a rougher texture which helps in recognition with practice in many cases.

The female genitalia are not difficult to separate by characters in the ductus and signum. In *caradjai* the ductus is narrowed near the ostium, but is otherwise fairly flat without conspicuous distortion. The signum is a long spine arising from a large saucer-like plate. In *quadripuncta* the ductus is contorted with bends below the ostium, and the signum is a spine arising from the centre of a strongly curved plate. *Deauratella* has a sclerotised ductus (as do the other two species) which has the bends below the ostium but is not otherwise strongly contorted. Its signum has a spine drawn out from towards one end of an irregularly shaped plate, often with one or two smaller spines. There is some variation within each species, especially in the shape of the signum.

In the male genitalia there are several characters which show only slight differences and these are not easily mounted in such a way as to give a constant appearance. For example Popescu-Gorj & Căpușe describe differences in the shape of the gnathos which I cannot confirm from the specimens I have examined.

The swelling towards the apex of the sacculus is certainly less pronounced in *deauratella* and is usually more bulbous in *quadripuncta*, but this can be misleading if the angle from which it is seen varies. The best characters are in the aedeagus, but the shape of the saccus and vinculum can help. All three species have cornuti comprising a patch of spines in the tip of the vesica; *deauratella* is easily separated by an extra conspicuous bundle of spines in the vesica, as well as a sclerotised ridge within the aedeagus; it also has a long drawn out saccus. *Quadripuncta* has the sclerotised ridge within the aedeagus long and pointed whereas that in *caradjai* is short and weak. The saccus of *quadripuncta* is also more triangular, as illustrated, but this tends to be distorted when the valvae are opened for arrangement on a slide.

The life histories of the species are as yet not distinguished, the larvae feed on decaying vegetable matter in the late spring and the moths are all on the wing in July and August.

The distribution of the species in Britain is not yet sufficiently known, but an interesting pattern appears to be emerging. *O. deauratella* is confined to the south east of England, scarcely extending west of London. The other species seem nearly to be allopatric, where one species is common the other seems not to occur. *O. caradjai* is well represented in old collections from Portland, with a number from Southend; more recent records for it are all from the south west or East Anglia, whereas *quadripuncta* occurs from London and central southern England extending from there north-westwards into Ireland. The only places where the two species have been recorded together are in the London area and in Devon.

DESCRIPTION OF SPECIES

Oegoconia caradjai Popescu-Gorj & Căpușe, 1965

bifasciella sensu Stephens, 1834

Synonymy. Stephens (1834) described two species: *quadripuncta* Haw. and *bifasciella* F.?, the latter having a broader yellow central fascia than *quadripuncta*. Although no specimens are extant it is possible that the second species was *caradjai*. *Tinea bifasciella* F. is in the synonymy of *Lampronia capitella* (Clerck) and, despite the ?, expert opinion advises that the name *bifasciella* is not available for this taxon as it was a misidentification by Stephens. The Stephens description is moved here from the synonymy of *quadripuncta* where it was placed by Bradley, Fletcher & Whalley (1972).

Description. Wingspan 13-16 mm. Head dark fuscous, face yellow, antennae fuscous but paler towards tip; thorax fuscous, tegulae fuscous at base, yellow thereafter. Hindwings light grey. Forewings (figs. 1,2) dark fuscous, a basal dot, a fascia about $\frac{1}{4}$ from costa nearly to dorsum, a broad complete fascia beyond middle, narrower on costa and a rather oblique fascia at about $\frac{3}{4}$, and apical dot yellow. There is considerable variation both in the width of the fasciae and in their colour. In some specimens from the Scilly Isles and Cornwall the yellow is so suffused with pale shining fuscous that there is little contrast between it and the darker areas. Usually the dark fuscous area between the second and third fasciae is reduced to a triangular blotch on the costa whose apex reaches, or nearly reaches the dorsum.

♂ genitalia. Uncus bicornute, but only gently concave between the tips, valvae long, sacculus free; before the curved pointed tip of the sacculus there is a bulbous swelling. Saccus (fig. 18) bluntly pointed, gently curved above as in a shield. The interior edge of the vinculum is rounded. Aedeagus (fig. 15) with cornuti comprising a patch of spines in the vesica, within the aedeagus is a short and weakly sclerotised part.

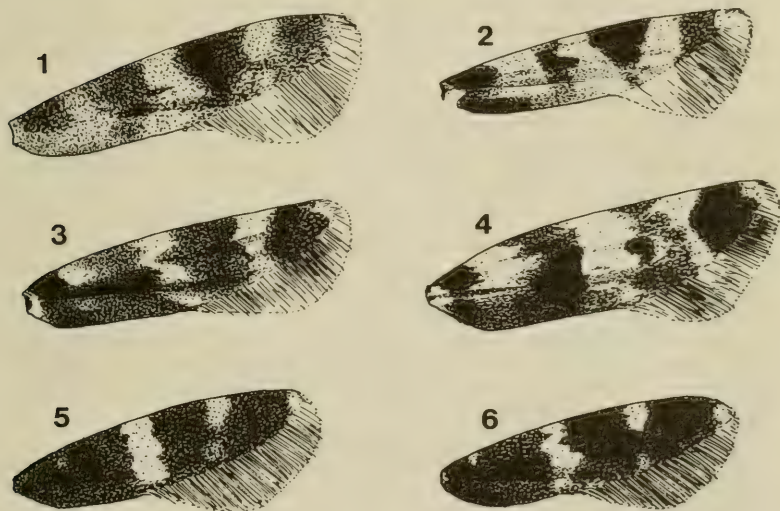
♀ genitalia (figs. 7,10). Ductus bursae sclerotised, without conspicuous folds and contortions, narrowed beneath ostium. The signum is a large crescent-shaped plate with a long spine arising from the centre of it.

Distribution: Confirmed records in England are from Cornwall and the Scilly Isles, South Devon, Dorset, Middlesex, North & South Essex and Lincolnshire. Abroad it is recorded from France, Spain, Morocco and other parts of northern Africa around the Mediterranean to Turkey and the Yemen, also near the western shores of the Caspian Sea.

Oegoconia quadripuncta (Haworth, 1828)

Type designation. There is no specimen of Haworth's in the British Museum (Natural History), nor is it contained in the list of specimens in the Ellis Collection in Yorkshire or in the Hope Dept. of Entomology at Oxford; it is therefore assumed that no type specimen of Haworth's exists. In a complex of species such as is found in this group it is desirable that the names be stabilised by the designation of a neotype, and all the conditions required by Article 75 of the International Code of Zoological Nomenclature are fulfilled.

O. quadripuncta was originally described as *Recurvaria quadripuncta* from the vicinity of London and from an unspecified number of specimens. A specimen in the Ford collection is hereby designated the neotype of *quadripuncta* Haw., it bears the data label: 'Bexley, July 1929, L. T. Ford' as well as a neotype label. The genitalia have been dissected and the slide is 'BM genitalia slide No. 14266 ♂'. Both specimen and slide are in the British Museum (Natural History).



Forewings of *Oegoconia* spp:

1, 2. *O. caradjai*, 3, 4. *O. quadripuncta*, 5, 6. *O. deauratella*.

Description. 13-16 mm. Head, thorax and hindwings similar to *O. caradjai*. Forewings (figs. 3, 4) dark fuscous, a small basal dot, a variable spot before $\frac{1}{4}$, usually in the costal half only, an irregular fascia beyond middle, an often interrupted fascia from costa to tornus variation in the width of fasciae and size of dot yellow. There is considerable variation in the width of fasciae and size of spots.

♂ genitalia. Uncus and gnathos similar to *caradjai*. Valvae also very similar but the costa tends to be a little straighter, sacculus with bulbous projection

before apex more pronounced; saccus (fig. 19) pointed and approximately triangular. The interior edge of the vinculum is almost square, especially when the valvae are spread open. Aedeagus (fig. 16) with cornuti comprising a terminal patch of spines in the vesica, a long pointed sclerotised part within the aedeagus.

♀ genitalia (figs. 8, 11, 12). Ductus bursae sclerotised, folds beneath ostium and in the middle of the ductus it is strongly contorted, this can look different if an attempt has been made to untwist it in mounting; signum variable, but consisting of a strong spine arising from the middle of a highly contorted curved plate.

Distribution: Confirmed records in Britain are from East and West Sussex, South Hampshire and the Isle of Wight, Surrey, West Kent, Middlesex, Buckinghamshire, Somerset, Gloucester, Dublin and Galway. Abroad it is recorded from Spain, Morocco, Hungary, Rumania and southern Russia.

***Oegoconia deauratella* (Herrich-Schäffer, 1854)**

bacescui Popescu-Gorj & Căpușe, 1965

Nomenclature. Although the type specimen has not been traced the description given by Herrich-Schäffer (1854) can be assumed to refer to this species as it is supported by a good illustration (Pl. 58, fig. 418). This illustration is named *kindermanniella* which is given as a synonym in the text, it appears to be a name first introduced in synonymy.

Description. Wingspan 11-15 mm. Head, thorax and hindwings similar to other *Oegoconia* species. Forewings (figs. 5, 6) dark fuscous, basal dot obsolescent, some trace of a spot near the costa at about $\frac{1}{6}$, a sinuous median fascia, a tornal dot and one opposite on costa and apical dot yellow. There is some variation in the extent of the yellow markings.

♂ genitalia. Uncus and gnathos similar to other *Oegoconia* spp., valvae also similar, but sacculus without the swelling before the apex. Saccus (fig. 20) drawn out into a point. Aedeagus (fig. 17) with cornuti comprising a terminal patch of spines and another patch of larger spines. A long pointed sclerotised part within the aedeagus as in *quadripuncta*.

♀ genitalia. (figs. 9, 13, 14) Ductus bursae sclerotised, with folds beneath the ostium but lacking other conspicuous distortion. Signum variable but forming a curved plate with spines drawn out from it, the principle one from towards one end; the signum can look very different according to the way in which it is mounted as it is so definitely three-dimensional.

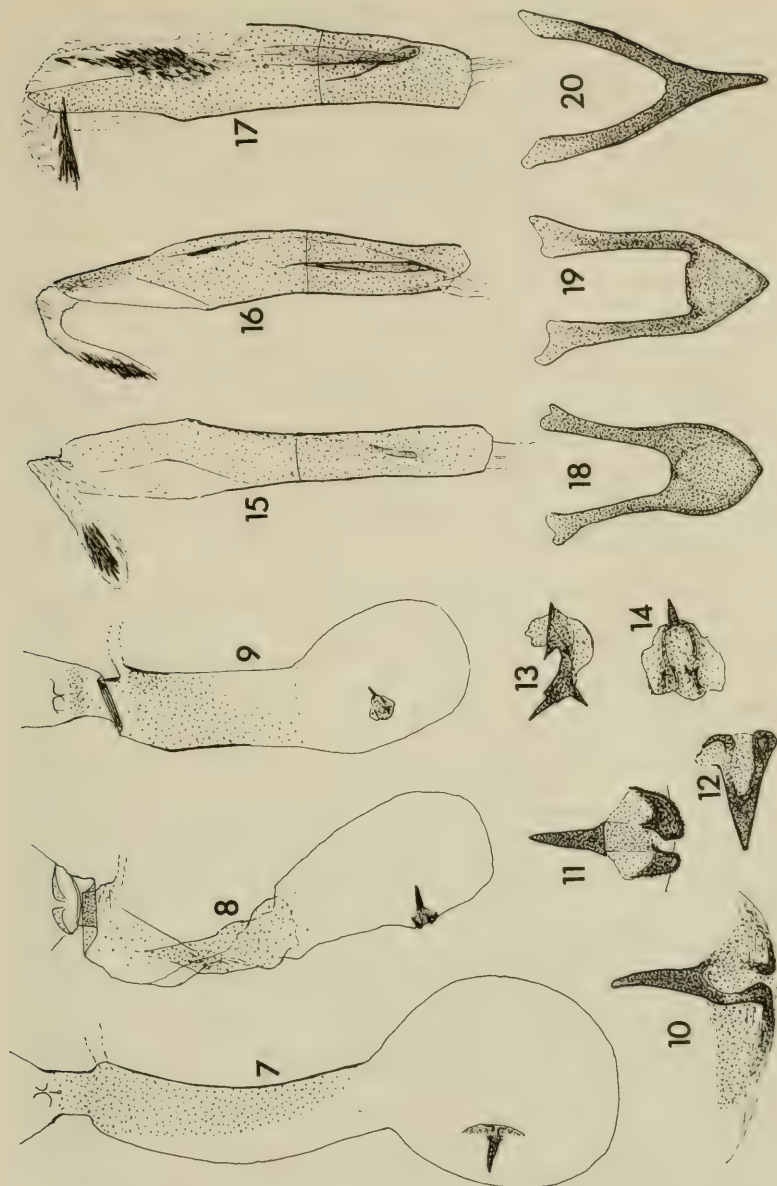
Distribution: Confined to the south-east of England, being recorded from Kent, Surrey, Middlesex, Hertfordshire, Essex, Cambridge and Suffolk. Abroad it is also of eastern distribution being recorded from Scandinavia, Austria, Hungary, Rumania and Russia.

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I would like to thank the following for advice or specimens: E. S. Bradford, Dr. J. D. Bradley, A. M. Emmet, R. J. Heckford, Dr. J. R. Langmaid, Dr. K. O. Sattler and P. A. Sokoloff.

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Genitalia of *Oegoconia* spp.

Ductus & bursa of female: 7. *caradjai*, 8. *quadripuncta*, 9. *deauratella*.

Signum (enlarged): 10. *caradjai*, 11, 12. *quadripuncta*, 13, 14. *deauratella*.

Aedeagus: 15. *caradjai*, 16. *quadripuncta*, 17. *deauratella*.

Saccus/vinculum of male: 18. *caradjai*, 19. *quadripuncta*, 20. *deauratella*.

WILDLIFE AND COUNTRYSIDE ACT, 1981†

by A. E. STUBBS

Chief Scientist's Team, Nature Conservancy Council

The evolution of this Act has been complex and the events during its final stages confusing. Royal Assent has now been given. The statement below outlines the implications of the Act for entomologists and other invertebrate zoologists.

SPECIES LEGISLATION

Earlier legislation affecting invertebrate species was embodied in the Wild Creatures and Wild Plants Act, 1975, which, together with various other previous legislation, has become absorbed within the new Act.

It is necessary to recall that the late Lord Cranbrook had tried to promote a Private Members Bill which entailed the definition of endangered and vulnerable categories. For the latter some collecting would be allowed but the legislative framework was unworkable. In the process he put up a list of about 150 Lepidoptera, which inevitably raised considerable consternation. Through the Joint Committee for the Conservation of British Insects, a list with a broader range of invertebrates was put forward in response, thus reducing the emphasis on Lepidoptera and including some less controversial rare species in groups which were not subject to collecting, but there was some scepticism that the Bill would ever get through.

When the Conservatives came to power they announced that there would be a government Bill. The Department of the Environment (without prior consultation with NCC) circulated consultation papers to a wide spectrum of bodies but ignored most of the invertebrate societies, though invertebrates were included. NCC circulated these papers to the societies. The revised Cranbrook list of species had been adopted, the government having given assurance that it would include the list that he had drawn up.

Jumping a number of moves, the essence is that the distinction between endangered and vulnerable categories was lost, so all listed species would be subject to complete protection. A list of species was given endorsement by the Societies, albeit that some had hesitation on certain species. Among the qualifications was the need to adopt area listing, as opposed to GB listing with certain butterflies. The perspective kept shifting during the passage of the Bill. It became increasingly clear that adjustment in stance was required. Area listing was swept out since this did not suit those promoting otter conservation. As precedents for future species to go on the Act, there was concern that the snails should come out altogether but efforts to get an airing on these got stymied in the procedures of the Report stage. Among the 1,000 amendments were additional invertebrates for inclusion on the schedule where no consultation was possible. Purple Emperor was put up and NCC advised against so that one was out but the Swallowtail went in unexpectedly when NCC only had 20 minutes to react at a time when the staff who ought to have advised were not available. The New Forest Burnet sneaked in (at least a more sensible one) and NCC put in the spider *Eresus niger* with full backing from the British Arachnological Society. However, everyone concerned is now well aware of the difficulties in exercising influence over the Committee stages of a Bill, the more so when Parliament lacks people who are fully conversant with the special considerations affecting invertebrates.

† This account is from a letter to the Hon. Secretary and is reproduced with Mr. Stubb's permission.

The position in the Act is as follows:— The previous Conservation of Wild Creatures and Wild Plants Act 1975 already prohibited the collecting of the Large Blue butterfly, *Maculinea arion*, and the Essex Emerald moth, *Thetidia smaragdaria* (the latter was added in 1979). After a complex series of manoeuvres, a further 17 invertebrates have been added:— 3 butterflies — Chequered Skipper (*Carterocephalus palaemon*), Heath Fritillary (*Mellicta athalia*) and Swallowtail (*Papilio machaon*); 4 moths — Reddish Buff Moth (*Acosmetia caliginosa*), Black-veined Moth (*Siona lineata*), Barberry Carpet (*Pareulype berberata*), New Forest Burnet (*Zygaena viciae*); 3 Orthoptera — Field Cricket (*Gryllus campestris*), Mole Cricket (*Gryllotalpa gryllotalpa*) and Wartbiter (*Decticus verrucivorus*); 1 beetle — *Chrysolina cerealis*; 1 dragonfly — *Aeshna isosceles*; 2 spiders — *Eresus niger* and *Dolomedes plantarius* and 3 snails — *Monacha cartusiana*, *Myxas glutinosa* and *Catinella arenaria*.

NCC has a statutory duty to revise the list at five year intervals, though there are procedures for adding or removing species at any time. If there is strong feeling that any species should come off, then it is a tactical question whether this will be easiest to raise now as a special case before the list becomes entrenched or in five years time when the procedure will seem less like special pleading. In some quarters the removal of butterflies, for instance, will be emotive with the challenge that entomologists only want them off the list so they can collect them, which proves that the list should not be altered. Thus any views should be entirely factual and based on the advice that would have been given had consultation procedures permitted comment before the Act went through in its present form.

The views of Societies on this list would be welcome. It seems unfair that the perspective has changed so much since views were last put forward. A new cool look if required. Any case for changes has not only to convince NCC (as government advisors), it has also to convince the Secretary of State for the Environment (currently Mr. Heseltine).

In order to assist your deliberations, I offer some comments on the list which may help concentrate thoughts on the points which require consideration.

Butterflies. The Large Blue has to stay. No sighting accepted as authentic since 1979.

The Heath Fritillary was originally put forward for listing in the SW only — it is in serious trouble here being down to only two colonies (according to current information available to NCC). If we cannot have area listing, then there is a strong case for its staying on the Act, at least until a research programme (due to start in April 1982) clarifies the status and conservation prospects.

The Chequered Skipper was earlier agreed for listing as England only (not positively seen since 1975). With the passage of time, it seems more realistic to judge this one on its current Scottish status and vulnerability to collecting.

The Swallowtail was sneaked on apparently because it is pretty and MPs have heard of it. There are views both within NCC and outside that this butterfly is largely holding its own and collecting within its habitat is not likely to make serious impact. There are, however, other views that as a spectacular butterfly, it is a good flag-waver for attracting public interest in insects — in other words, now it's on, leave it on.

Moths. Species with small populations on single sites are Essex Emerald (there is unsubstantiated rumour of a small second colony but this hardly alters its critical status), Barberry Carpet, Reddish Buff and New Forest Burnet. It would have to be a very well argued case to get any of these off and my current view is that they deserve to stay put.

Orthoptera and Odonata. These are unlikely to cause controversy. The mole cricket is desperately difficult to find but all four are appropriate species in groups which are not, and should not be, subject to pure collecting.

Beetles. The so-called rainbow leaf-beetle (Parliament has to have a common name for everything) is a rare colonial species in Snowdonia. The populations are small and ought not to be collected.

Snails. There would be strong grounds for taking all three off. The sandbowl snail can only be identified by dissection and its main GB population is on an NNR where it is abundant. This is not a satisfactory precedent for candidate species. The Conchological Society has earlier expressed reservations. I tried to get all three off but in the chaos of parliamentary procedures, the issue was not resolved.

I have made enquiries on circumstances affecting entomologists, the following being my current understanding. The above species will be subject to complete prohibition against collecting, with fines up to £1000 per specimen (ie. even an egg). Specimens and rearing stock obtained before that date are in the clear, but the onus of proof is on the individual (the reverse of the normal legal position). Stock released onto a site (even where that species is not native) then becomes 'wild', so is equally subject to these provisions. To disturb these species is also illegal, but it is possible to capture or pick up a specimen in order to identify it providing one has just cause (i.e. it is not necessary to capture a swallow-tail in order to identify it but with some moths this may be necessary). To 'take' a specimen from its immediate location is strictly illegal. These provisions apply to listed animals in general, so invertebrates do not have any special concessions. NCC is able to issue licences for the handling or taking of specimens, in practice applying to studies or conservation measures which assist the future of the species concerned.

Circumstances could arise where someone unwittingly took a protected species without realising the identification. Should this happen (the Reddish Buff Moth for instance is not terribly distinctive among the noctuid moths) then the best thing is to report the circumstances to NCC (via me) otherwise there may be the embarrassment of having an important new locality and being afraid to come out with the fact. However, it is reasonable to expect people to be aware of the identification of protected species and any specimen taken would be directed to a museum (or Society) collection so that no one can take advantage to acquire specimens for his own collection. Killer traps ought not to be used where it is known that protected species may be caught but there could be circumstances where unforeseen embarrassment arises. Again, it is best to come clean. This sort of legislation is not designed to trip up the innocent and sensible entomologist but it is there as a stand-by to deter and if necessary to punish selfish and irresponsible actions.

The new Act continues the 1975 provisions prohibiting trade of any type (including barter) in specimens of protected species – its not worth risking fines of £1000 per specimen.

It is now illegal to release or allow to escape into the wild any animal (includes invertebrates) of a 'kind' which is not resident in Britain or is not a regular visitor in a wild state. The word 'kind' was carefully chosen and will be interpreted as any genetic population derived from outside Britain. Thus to release species into Britain or to release foreign stock of a British species is unlawful.

It is worth a reminder that uprooting of wild plants is an offence unless the landowner has given permission. The list of totally protected plants, where even to pick a piece is unlawful, has been extended to 61 species (all of which are rarities).

One problem with all embracing legislation is its indirect pitfalls – literally. If one puts down pitfall traps (for say spiders or beetles) and you trap protected sand lizards, move those traps quickly. All trapping of protected species is banned, a nice catch 22 situation since you might not know a protected species is there until you have trapped it. Anyway, the general philosophy of common

sense and avoiding awkward circumstances which could reasonably be anticipated is all one can recommend.

Under normal circumstances (after the framework of legislation has been decided by parliament) it is NCC which advises on the species lists in such an Act. Thus species can be added or subtracted providing the Secretary of State for the Environment agrees to an order being placed before the House. It is clear that some tidying up of the species lists is required in order to straighten out some of the anomalies that have arisen.

I am as anxious as anyone to try to finish up with a sensible list which carries the support of the Societies as far as is possible. There is widespread apprehension that we are going down the slippery slope towards a ban on all collecting, or at least sufficient ban to make field work intolerable. NCC certainly does not support the concept of all embracing bans – administratively it is impractical anyway. More important it is recognised that collecting is a necessary part of field work for most invertebrate groups. The help that increasing numbers of entomologists are giving with the Invertebrate Site Register, as well as BRC schemes etc., is a very powerful reason why NCC should continue to resist unnecessary extension of species legislation. I hold the view that the best insurance entomologists have is by working with the conservation bodies, as with the Invertebrate Site Register, so that there is developed a proper level of understanding and co-operation. The synonymy in many minds between the entomologist and the kleptomaniac collector is best quashed in a practical way. At the same time it should be recognised that legislative lists, if properly chosen, can be of value as a deterrent to the unscrupulous collector.

HABITATS

Whilst the species side of things may be a mixed bag, on the habitat aspects of the Act things have worked out extremely well.

It is recognised that habitat conservation is the key issue, a truth which the government did not sufficiently recognise to start with. There were more letters to Westminster on this Bill than just about any other issue in modern times and there were concerted lobbying and delaying tactics which eventually led the government to change its position at the last minute. Whilst the Act covers a great range of countryside issues, much of the furor was over the future of Sites of Special Scientific Interest. SSSI could not effectively resist pressures from modern agriculture and forestry. Nationally about 10-12% were damaged or destroyed in 1980, the figure for Dorset being 32%. The implications sank home and incredibly we have finished up with measures which are potentially stronger than on many NNR leases.

NCC now has the legal requirement to inform all owners and occupiers of SSSI of the scientific content of their land and to define what activities will require consultation. Should an owner wish to pursue damaging activities, he must give written notice. NCC has three months to decide on possible safeguard action; beyond this period an Order by the Secretary of State would be required if voluntary negotiation was unlikely to succeed. This would allow a further nine months for negotiation and the possibility of compulsory purchase as a last resort. The very last twist to the Bill made it compulsory for NCC to offer compensation to an owner or occupier if agricultural (probably forestry as well) grant is refused on nature conservation grounds (instead of grants to grow barley, farmers will be compensated for growing wildlife). The financial implications could be enormous, though the National Farmers Union (who were taking stance with NCC) and the Country Landowners Association are asking farmers to behave responsibly (otherwise more stringent measures may be forthcoming). Whether government will meet the financial needs remains to be seen, but it is hardly likely that they can abandon SSSI after totally committing themselves to the semi-voluntary process.

Whilst naturalists have rightly had a jaundiced view of SSSI in the past, the status of an SSSI has now changed almost beyond recognition. It must also be recognised that the Act does nothing to reduce the rate of loss of sites not designated SSSI and provides no formal opportunity to influence management on otherwise safe land.

This places the future of invertebrate conservation very much into the hands of entomologists. Through the Invertebrate Site Register, the important sites and the management needs of those sites must be identified. It is then possible to confer on them a degree of safeguard far beyond anything possible before. Even on 'safe' pieces of ground it is possible to exert a considerable influence over future management. By means of SSSI prescriptions NCC can define in some detail the management activities which need to be discussed with NCC and for the legal machinery to go into action if necessary to ensure that the wildlife interest is not damaged. It is now not simply a question of preventing a grassland being destroyed, it is now possible to avoid damaging grazing regimes. NCC has to advise all SSSI owners and occupiers of the necessary prescriptions by the end of 1982, which means information is needed urgently on the invertebrate faunas so that the wrong management prescriptions are not given (e.g. what suits the botanical interest may not suit the invertebrate fauna). It will be much more difficult to change the prescriptions in the future, though clearly as new information comes forward this hurdle will have to be met. Also there may be new SSSI which deserve designation for their invertebrate interest. In the meantime, heavy use is being made of the existing information in the Invertebrate Site Register (which is far from complete because many people have still not responded) and the general management prescriptions for all habitats will take account of general guidelines on invertebrate needs.

SOME OTHER POINTS

At long last, water authorities and drainage boards have a statutory duty to consult NCC over activities affecting SSSI. It is to be hoped that they will also heed that advice.

Also, marine conservation, including marine reserves, is now officially within NCC remit.

The Act includes a vast array of other measures on a wide range of amenity issues including footpaths. It is still unclear what all the ins and outs are but no doubt there will be news on interpretations by bodies in this field. If anything of concern to entomologists emerges, I will at least consult the JCCBI.

CONCLUSION

As I write I have only just seen the final published Act and I have no doubt it will be several months before all the detail is absorbed and the implications from a whole variety of angles emerge.

However, it is clear that there is a great deal of benefit in the Act, particularly as regards habitat safeguard. It is now a question of maximising on these advantages. By comparison the disadvantages almost pale into insignificance, though they are real enough in some viewpoints, but there is a good chance of ironing out the more serious defects.

Advice and comments are welcome, preferably via the Societies in order to achieve some distillation of views.

18 December 1981

Status of the Foresters (*Procris* spp.)—It has become apparent that we know very little about the precise habitat requirements and finer details of biology of these three species. I should therefore be glad to hear from anyone who knows of

recent colonies of any of the three species, namely *Procris geryon*, *P. statice* and *P. globulariae* and urge recorders to check any sites where the species occurred in the past. Information gleaned will I hope be presented at the end of the field season and all records received will be fully acknowledged. Records should be submitted to M. Hadley, c/o Nature Conservancy Council, 20 Belgrave Square, London SW1X 8PY.

Observations on the ectoparasitic stage of two *Homobbus* spp. (Hym: Braconidae). — The first, *Homobbus infumator* (Lyle) was bred from a larva of *Campaea margaritata* (L.) (Lep: Geometridae) beaten from privet in woodland at Salfords, Surrey 15.iii.81. The host was killed as a pre-pupa 2.iv.81 and was then consumed by the previously endoparasitic maggot. The maggot first seems to drain the larva of fluid and then is observed to consume the skin of the host. A ♀ was bred 22.iv.81.

The second species, *Homobbus discolor* (Wesmael) was one of two bred from the same host larva beaten in the same locality but on 4.v.81 also from privet. In this instance the internal maggot appeared from segment 6 (head = 1) of the prepupal host which seems to be encouraged to spin a cocoon apparently essential for the survival of the maggot. It then quickly attached itself to between segments 9 and 10 of the still living host. At this stage (10.v.81) the maggot was smaller than the host and distinctly "dry" looking. It evidently pierced the skin of the host. For over 2 hours the host gradually shrunk as it was drained of liquid while the maggot grew in size becoming somewhat translucent. After draining the host the large maggot devoured all the skin, save the head capsule and then slowly spun its white cocoon with its distinct white translucent band. The cocoon always seems to be spun in the flimsy cocoon constructed by the host. The maggots have been observed to die if removed from the cocoon or detached while feeding outside the host. An adult ♀ (the ♂ *discolor* is unknown) was bred on 26.v.81. — Dr. A.A. Allen.

***Polygonia c-album* L. bred in June 1981 without *hutchinsoni* form.** — A female *Polygonia c-album* L. f. *hutchinsoni* Robson was caught in the garden on 16.vii. 1980 and eggs were laid on and after 19.vii. The autumn brood was bred through and six of them were retained to overwinter.

On 3.iv.81 there was a pairing and another followed on 8.iv. Stinging nettle was provided on 10.iv. Eggs laid over the next five days were retained. The eggs were brought into the warmth of the house to avoid cold weather, as in 1979 none of the eggs from an early pairing hatched.

The eggs commenced hatching on 24.iv, after about the same length of time as usually recorded. The first larva was pupating on 28.v, also after about the same length of time as usual, but this time, half the period was indoors and out of the sun for most of that.

Emergence took place between 19th and 30th June. There were 71 in all and every one of them was of the typical late summer form which overwinters.

I note that in South's British Butterflies, Mr. T.G. Howarth says that f. *hutchinsoni* is produced when the larvae resulting from hibernated butterflies feed up quickly, while those that feed up more slowly produce butterflies of the normal form at a slightly later date. I wonder whether the lack of sun could have had the same effect, since the time breeding was not noticeably longer. — A.S. Wheeler.

CONSERVATION AT WORK IN THE MINISTRY OF DEFENCE†

by C. N. CLAYDEN

Cons. Officer, M.O.D. Lands 3, Tolworth Tower, Ewell Rd., Surbiton, Surrey.

The Ministry of Defence owns about 600,000 acres of freehold property of which 278,000 acres are under agriculture and 432,000 covered by Conservation Groups. Inevitably there must be certain priorities laid down for the usage of this property and that is clearly stated as:—

- The Military requirements.
- Agriculture including Forestry.
- Conservation.
- Access.

I see the tasks for conservation therefore as being:—

- To record all the wild life, habitats and sites of historical and scientific interest and to monitor those records.
- To produce a vegetation, archaeological and sensitivity map.
- To prepare management proposals.
- To implement those proposals accepted.
- Liaison with other conservation and naturalist bodies.
- To educate both the Services and the public in conservation.

Who is going to do all this? The MOD have no additional money or labour they can devote to these tasks. We of course resort to the good old British compromise of volunteers. Currently there are 130 groups involving some 4000 volunteers. These are dedicated and genuine people who are only concerned with preserving our historical and natural heritage.

The conservation groups are formed at sites where the interest warrants such a group and these are the people available to form the group. They vary in size and in their exact mode of operation. They are, however, providing us with the facts and figures which enable us to speak from knowledge and not ignorance.

I would like to now talk about some of the ecosystems within our property and their importance and some of the problems of management.

CHALK DOWNLAND

There are over 100,000 acres, but not all of it is prime downland. We have tens of acres of kidney vetch interspersed with some 18000 young juniper bushes, on which we have identified 14 of the 16 species of invertebrate. The woodlands and chalk downland flora, numbering some 297 species to date, supports 36 species of butterflies. The interesting fact is not the number of species but the great number of any one species there can be seen.

Areas of spreading scrub and lichen-rich areas are associated with the 200 species of spiders identified. This is a third of the total spider fauna. There is an 'ant-scape' of 3,000,000 anthills: 1,000,000 are operative and are said to house 35 billion ants.

The variety of habitats provides sanctuary for 102 species of birds of which 66 are breeding and includes the rare Stone Curlew.

The problems facing the management of chalk downlands are many: the spread of scrub and long grass through lack of grazing or cutting; erosion caused by over grazing or use; the loss of beechwoods due to beech bark disease and the loss of land to agriculture including forestry, particularly coniferous woodland; damage by deer.

† Abstract of paper read 14th May 1981.

BRECKLAND

We have a great diversity of habitat set in comparatively unspoilt countryside. 17000 acres of Breckland in Norfolk with its 543 species of plant, to date, and 185 species of birds, down the years. Where else can you find all six species of deer? The River Wissey meanders for 14 miles through the centre of the area, providing a haven for otters and excellent fishing. It is probably the purest river in Britain. The meres, a speciality of the "Breck" are unbelievably rich in wildlife. One mere has revealed to date three species of Coleoptera which were last recorded in these parts in 1890, 1900 and 1906. Of the 811 invertebrates so far identified the Caddis fly *Holocentropus stagnalis* (Albarda) has not previously been recorded in Norfolk. The Sawfly *Amauronematus amentorum* (Foerster) was last recorded in 1878. There are 114 flies of which *Pachygaster minutissima* is the first for East Anglia. Rivers need monitoring for pollution. The Breck, if not grazed, turns to scrub and secondary woodland. The meres become choked with vegetation and there is the ever-present bracken which romps away at will.

DUNE SYSTEMS

We have eight marvellous dune sites as part of the 212 miles of the coast of Britain which the MOD owns. This habitat has its own unique flora and fauna and is particularly rich in plants, birds and invertebrates. Whereas these dune systems are well covered with heath or marram and there is very little wind-blow, there are problems, however. Buckthorn spreads with alarming speed and destroys all other vegetation reducing the plant, bird and invertebrate life. It is important to retain areas of wet and damp areas. This has meant the construction of artificial waterways.

The other coastal sites are important for the largest cockleshell island in the country, the largest concentration of Brent Geese at any one time, a fifth of the total world's population. Two estuarine sites are in the top ten for Waders. There are cliffs which are not part of any long distance walk where Peregrine, Chough and Raven can live and breed in comparative peace; where the vegetation has not changed in 50 years.

I think it would be interesting at this point to relate the story of the horseflies. The activities of tabanids caused problems to troops training who were liable to be bitten 200 times if remaining in a particular area for up to an hour. Patient research revealed a colour particularly attractive to the horseflies and, with the aid of silhouette targets and a non-hardening glue, 30,000 or more female horseflies were caught. By this means some control could be exercised over the total population at one time. Research continues.

CAVES

I would like to just mention our investigation into some of the cave systems to be found on our property. One particular site in the middle of Wiltshire boasts 9 of the 15 species of bats including the Beckstein and the Greater Horseshoe, both scheduled species. Two species of moths winter, the Tissue and Herald, mosquitoes are not in short supply and an interesting spider occurs which, as far as we could determine, survives on its own progeny. The rock faces of this site boast the skeleton of a crocodile and ammonites are plentiful.

HEATHLAND

The last and, to me, probably one of the most interesting ecosystems to be found is heathland. We have some 25,000 acres of varying grades. What we do have is all the special species of flora and fauna associated with that habitat. To quote from one site, there are 133 species of birds of which 80 are breeding. 34 species of butterflies, 378 species of moths, 478 species of plants, 15 dragonfly

and 9 damselflies, all three snakes, lizards and Natterjack toad. There are so far 77 species of terrestrial Coleoptera and 57 species of aquatic Coleoptera including *Graphoderus zonatus* (Hoppe), the only place in Britain, I am told, it can be found. Heathland is a fast diminishing commodity in the world. Britain has probably the best examples of the various sorts still in being. These, however, are being greatly fragmented. We are therefore considering a national strategy to safeguard heathlands.

I think you will have gathered from my talk that we have made some progress in five years. We lack coverage of the invertebrates and would ask you to help us fill this gap. We have had a good response to initial request. I think we will now specify areas in which we need help. There is much work to be done but I can assure you it will be most rewarding.

DOLICHOVESPULA MEDIA (RETZIUS) — A NEW BRITISH SOCIAL WASP

by S.J. FALK

A male *Dolichovespula media* (Retzius) was taken on the 18th August 1980, flying around herbaceous vegetation at the edge of a ride in Friston Forest, Sussex, a few hundred yards north of the Seven Sisters Country Park Information Centre on the coastal road (A259).

The wasp warranted attention on capture by virtue of its strange appearance, being a male, resembling a queen *Vespula vulgaris*, but with the wide malar space as in a *Dolichovespula* species. The specimen superficially agreed with all the obvious characters of *D. norvegica* (F.), but was decidedly larger, without any signs of rufous lateral markings on the side of tergite 3 and having peculiar thoracic markings.

The specimen was taken to the British Museum (Natural History) and given to Mr. G. Else, tentatively named as *D. media*. Prof. O.W. Richards kindly confirmed this identification. Reference to the British Museum collection showed that in Europe this species is highly variable, being very dark and hirsute in the northern and highland districts (f. *media*) and very pale and less hairy in southern and lowland districts (f. *geeri*). The specimen concerned is intermediate between the two forms, which would agree with its probable origin across the English Channel. Its forewing length is 14.2 mm (from the distal end of the tegula to the apex of the wing membrane) compared with a 14.2 mm to 16.3 mm range in the British Museum.

Key to British species of *Dolichovespula* Rowher (Long-cheeked Social Wasps). Nomenclature based on *Social wasps (their biology and control)* by Robin Edwards.

Males

1. Genitalia with hairless gonostipes (genital capsules), with their internal margins extending forward into two well-developed points (when viewed dorsally). Apex of penis not expanded nor laterally compressed . . . *sylvestris*
- Genitalia with hairy gonostipes, with their internal margins evenly rounded to form only one point. Apex of penis expanded and laterally compressed . . . 2
2. Last visible sternite (sternite 8) strongly notched at apex. Penis strongly expanded at apex. Antennae with segments 4-13 bearing pairs of projecting tyloidea on their undersides. Strong build, size intermediate between the males of the hornet and other British wasps. *media*

- Last visible sternite not notched at apex. Apex of penis only slightly expanded and laterally compressed. Antennal segments without tyloids, or at most a slight ridge on the lower face of the last segments. A slightly smaller species of typical wasp dimensions *norvegica*

The males vary somewhat. The darkest f. *media* lack thoracic markings, have narrow yellow abdominal bands and bear a very long, dense, black pubescence. The palest f. *geeri* have well developed thoracic markings, very wide yellow abdominal bands with rufous spots and a short, mainly yellow pubescence. The face of most specimens bears a distinct stripe, which is occasionally reduced or vestigial.

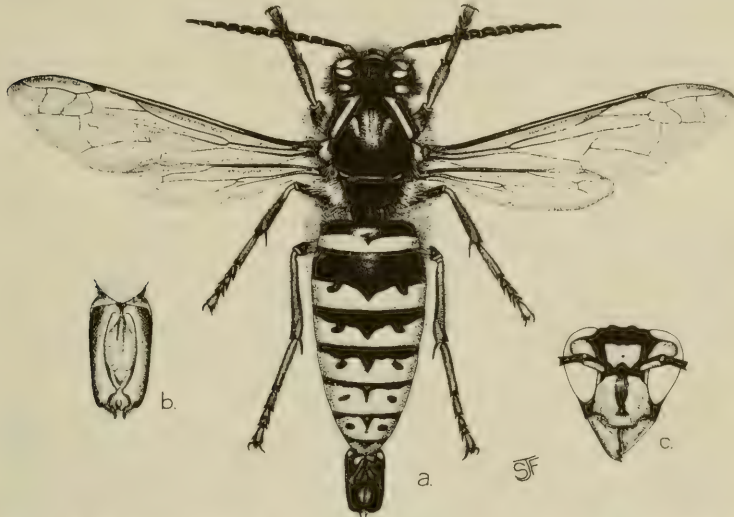


Fig. 1 Male *Dolichovespula media*. a - dorsal view. Genitalia extended but angled downwards. b - genitalia, dorsal view. c - head, front view.

Females

1. Ocular sinuses (eye notches) completely yellow. Humeri and scutellum often extensively orange, especially in queens. Strong build, size intermediate between appropriate castes (worker or queen) of the hornet and other British wasps. *media*
- Ocular sinuses with only a narrow yellow line along their lower margins. Orange markings at most limited to the sides of tergite 3 in the majority of *norvegica*, otherwise absent 2
2. Clypeus entirely yellow or with a median black spot. Punctuation of clypeus small and dense, more so on the bottom than at the top . . . *sylvestris*
- Clypeus with a wide, median, longitudinal black fascia, widened towards the centre, or with a large spot or irregular strip, never entirely yellow. *norvegica*

It should be noted that the queens, particularly of the paler f. *geeri*, can be quite hornet-like, with a mainly yellow head capsule and highly developed orange pronotal and scutellar spots. Queens of f. *media* can be very dark, with no thoracic markings and very restricted yellow markings on the abdomen. The face usually has a distinct stripe, occasionally reduced to a spot.

The workers likewise show tremendous variation, ranging from a near black insect with very narrow abdominal bands in the darkest f. *media* to a very pale insect with large thoracic markings and restricted dark abdominal markings in the

palest f. *geeri*. The face usually has a distinct stripe, occasionally reduced to a spot.

The origin of the male specimen is unknown. It was in a very fresh state when taken, and it is known that male wasps are fairly sedentary insects. The winds around and before the capture were north easterly and could not have been responsible for transporting the insect from the adjacent continent. The 1980 ferry strike was also in progress, so passive transport to nearby Newhaven seems unlikely, though private yachts may have been crossing the Channel. It seems most probable that the wasp originated from a nest in the Friston Forest area, originated by a queen transported to our coast either by suitable winds earlier in the year or on a boat. There seems no reason why this species should not establish itself in England as it occurs throughout Eurasia from Spain to Japan and occurs from southern Europe to Siberia at altitudes attaining 2000 m.

My thanks are expressed to Prof. O.W. Richards for confirming the identification and to Messrs. G. Else and A.E. Stubbs for advice during the preparation of this paper.

BENHS Field Meeting: Deep Dene and Lullington, Sussex, 22.viii.1981. Leader: M. Hadley. — Four members plus friends attended the meeting in a normally sheltered coombe in the Downs, but a gale blew in the only direction in which we had no shelter from the wind. In spite of this, the following species totals were achieved, Butterflies 13, Coleoptera 11, Hemiptera 2, Orthoptera 5, and 39 Lepidoptera recorded at light in the evening. It was encouraging to see most of the typical chalk downland butterflies and moths, particularly *Eremobia ochroleuca* (D. & S.), *Epirrhoe galiata* (D. & S.), *Eupithecia pimpinellata* (Hübner), *Tholera cespitis* (D. & S.) and *Scotopteryx bipunctaria* (D. & S.).

Species of note included the only colony, as far as I know, of *Mecyna flavalis* (D. & S.) in East Sussex. This moth proved abundant upon the short rabbit-cropped downland turf, together with the Chalkhill Blue *Lysandra coridon* (Poda) from areas where *Viburnum* and *Crataegus* scrub dominate the slopes. Also of note was a specimen of *Eupithecia phoeniciata* (Rambur) recorded that night. It would seem from the accelerating trend in records of this species in the south east that it is now firmly established.

My thanks are due to the Reserve Warden, Mr. Alan Bowley (Nature Conservancy Council), who found time to join us on the meeting, and to Eastbourne Waterworks Company, who gave permission to take the motor cars into the Dene, which was much appreciated.

STUDIES ON BUTTERFLY POPULATIONS

by JOHN FELTWELL

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ABSTRACT

Quantitative observations on abundance and movements of butterflies in the Cévennes (France, 30440) were made during Augusts from 1978 to 1981 (though mostly 1978) using a variety of methods. The abundance of 24 species was calculated by a modified Pollard's (1977) method. The population of three species, the Scarce Swallowtail (*Iphiclides podalirius*), the Sloe Hairstreak (*Nordmannia acaciae*) and the Common Blue (*Polyommatus icarus*) were investigated by mark and recapture techniques and by the method of Douwes (1977). A new method, described as the 'Area Intrusion Method' was used to give information on the abundance of the larger diurnal Lepidoptera, the degree to which they move across a defined area, whether or not they are likely to settle in that area and their territories.

INTRODUCTION

Estimating butterfly numbers in defined areas is fraught with many variables such as births/deaths, immigration/emigration, predation, weather conditions and availability of foodplants. Choosing a 'closed habitat' may not be as easy as it may appear to the human eye as physical barriers do not always determine closed populations. Nevertheless, textbooks do advocate finding a closed habitat on which to work on butterfly populations.

There have been few studies on the abundance of several different butterfly species in the same area at the same time. Recently success has been had by the 90 contributors monitoring butterfly populations throughout Great Britain using Pollard's transect method (Hall, 1981). Fraser (1973) has highlighted some of the variable factors in estimating butterfly numbers and Owen (1975) has published some comparative information on the abundance of butterflies in gardens in England (Leicester) and Africa (Sierra Leone, Uganda) based on a marking technique and captures in Malaise and baited traps. The importance of making studies on butterfly populations is that it sheds light on inter- and intra-specific relationships, competition, foodplant availability and dispersal of butterflies.

In the southern part of the Cévennes drought conditions persisted in 1978 and it did not rain between the middle of June and the end of November. This meant that the weather was consistently good with clear blue skies and temperatures in the shade of 90°F. Quite unexpectedly, *I. podalirius* was the most abundant butterfly flying at this time, and had not been seen by the author in such large numbers during the previous eleven years. It was therefore ideally suited for mark and recapture studies. Normally *I. podalirius* is more frequent than the Swallowtail, *Papilio machaon* L. (Feltwell, 1981). The studies on *I. podalirius* were carried out on a terraced promontory (c. 1000 m) around some habitations. The terraces have not been worked for over sixty years and they are overgrown with Olive, *Olea europaea* L., Pomegranate, *Punica granatum* L., Bramble, *Rubus* sp., Sweet Chestnut, *Castanea sativa* Miller and plenty of the foodplants of *I. podalirius*: Sloe, *Prunus spinosa* L. and cultivated fruit trees. The surface area of the terraces involved about five hectares.

It was very difficult to find a closed habitat, that is an enclosed area where immigration and emigration could be expected to be minimal and the populations might therefore be expected to be closed, but the nearest to this description was a small meadow (an old mulberry terrace) at the bottom of a very steep-sided valley surrounded by trees but open at each end by a stream. Unfortunately,

I. podalirius did not fly here in any numbers so it was decided to investigate by mark and recapture the abundance of the two most abundant butterflies, *Nordmannia acaciae* (F.) and *Polyommatus icarus* (Rott.).

In order to investigate the abundance of most other butterflies around the terraces a modified form of Pollard's (1977) method was used. The original method relies upon the observer walking a defined path, through as many different habitats as possible, noting butterflies once every week during the butterfly season, but in this study more frequent sampling was made.

The Area Intrusion Method was devised to observe butterfly behaviour in a defined area and was used here for a total of five hours over several days. Information about abundance and movements of butterflies and their likelihood of staying in an area has been assessed.

METHODS

Capture-recapture methods. Two methods of marking the butterflies were used; painting dots with Humbrol Enamel paint (Red No. 51 and Green 50) and Airfix Matt paint (M6 Black). Airfix Gloss paint (G7 Gold) was not found suitable as it did not stick when applied to the butterfly wings. The pierids *Pieris brassicae* (L.), *P. rapae* (L.) and *P. napi* (L.) and the lycaenids *Polyommatus icarus* and *Nordmannia acaciae* were painted with small dots on the apex of the undersides of the forewing, different coloured dots for different days and different numbers of dots on different wings if the same colour was used again.

TABLE I Mark and recaptures in two different habitats

Species	Date	Numbers marked	Resampled	
			marked	unmarked
1. CLOSED HABITAT (an enclosed mulberry terrace)				
<i>Nordmannia acaciae</i>	14 Aug.	15		
	16 Aug.		0	15
<i>Polyommatus icarus</i>	14 Aug.	20		
	16 Aug.		2	14
2. APPARENTLY OPEN HABITAT (a hamlet situation)				
<i>Iphiclides podalirius</i>	a) 12 Aug.	24		
	13 Aug.		11	11
	14 Aug.		5	7
	17 Aug.		4	7
	27 Aug.		1	0
	b) 13 Aug.	22		
	14 Aug.		3	
	17 Aug.		1	
	c) 14 Aug.	7		
	17 Aug.		0	
	d) 17 Aug.	7		
	18 Aug.		0	

The larger papilionid butterflies *P. machaon* and *I. podalirius* were marked with 'Ryman' 0.8 cm diameter self-adhesive fluorescent pink dots (No. 8 – coloured). These were stuck onto the upperside of the forewing after removing some scales and were numbered. The advantage of this was that the spot could

oe seen up to thirty metres away and in the case of *I. podalirius* the number could be read off while the insect was feeding (cf. Feltwell, 1981).

Lincoln Indexes were calculated according to the equation

$$P = an/r$$

where P = total population, a = total number marked, n = total number of individuals in the second sample and r = total recaptures.

Pollard's (1977) method. The method for assessing changes in abundance of butterflies involves walking around a defined transect each week and recording all the numbers of each species encountered five metres in front and to the side. Although the method was designed to provide information over several years it was used here to provide information on alternate days.

The transect chosen for this study passed through six distinct habitats: I, a dirt track which supported quite a variety of flowering plants (c. 270m long); II, an area of overgrown terraces with bramble, Broom (*Sarothamnus scoparius* (L.)), Bracken (*Pteridium aquilinum* (L.)) and Sweet Chestnut (c. 100m); III, a kitchen garden area with a selection of brassicas (c. 50m); IV, a grass track (c. 208m), V, an area of grassy olive terraces (c. 85m) and VI, a hamlet situation (c. 50m).

In order to walk at a constant rate and avoid misidentifications it was necessary to group similar-looking butterflies together, a situation which is not so critical in Britain, but Pollard suspected misidentifications with *P. rapae* and *P. napi*. With 138 butterfly species in the Cévennes (Feltwell, 1977) and about 40 species on the wing during August when this study was made, it was necessary to make six groupings:

- i) *Pieris* group: *P. rapae* and *P. napi*.
- ii) *Gonepteryx* group: *G. rhamni* and *G. cleopatra*.
- iii) *Coenonympha* group: *C. pamphilus* and *C. arcania*.
- iv) *Lycaena* group: *L. phlaeas* and *H. tityrus*.
- v) *Colias* group: *C. croceus*, *C. hyale*, *C. australis*.
- vi) *Pyrgus* group: *P. serratulae*, *P. malvae*.

TABLE II Abundance of butterflies (modified Pollard's Method)
Listed in order of abundance

Species	Numbers recorded								Total
<i>Melitaea didyma</i>	32	32	50	29	36	20	14		213
<i>Pieris</i> group	17	15	15	22	13	12	12		106
<i>Coenonympha</i> group	15	14	17	13	13	21	12		105
<i>Polyommatus icarus</i>	7	8	17	8	9	4	13		66
<i>Satyrus actaea</i>	4	3	10	1	8	6	9		41
* <i>Semiothisa clathrata</i>	7	4	4	5	3	3	0		26
<i>Iphiclidus podalirius</i>	7	4	5	2	1	6	0		25
<i>Lasiommata megera</i>	3	3	4	5	2	2	4		23
<i>Maniola jurtina</i>	0	3	1	4	4	3	2		17
<i>Hipparchia semele</i>	4	3	0	5	2	0	1		15
<i>Pyronia tithonus</i>	1	3	2	1	3	2	1		13
<i>Pieris brassicae</i>	3	3	0	3	1	1	1		12
<i>Colias</i> group	1	4	1	1	0	3	2		12
<i>Lycaena</i> group	2	1	0	0	2	2	1		8
<i>Papilio machaon</i>	1	1	2	2	0	1	1		8
<i>Brintesia circe</i>	0	1	4	1	0	0	0		6
<i>Gonepteryx</i> group	0	1	1	0	1	0	0		3
<i>Pyrgus</i> group	1	0	0	0	1	0	1		3

*diurnal moth

Table III Distribution of *Melitaea didyma* Esper through habitats

Day	Habitats (see text)					
	I	II	III	IV	V	VI
20 August	16	4	1	2	5	4
22 August	21	6	3	1	1	0
24 August	30	5	3	3	3	6
26 August	21	1	1	3	2	1
28 August	26	2	1	2	3	2
30 August	12	0	1	3	3	1
1 September	11	3	0	0	0	0

Douwes (1977) Area Census Method. This method involves walking at approximately 1m/sec along a zig-zag path through a chosen area, while making 5m between zigs and zags and noting the number of butterflies seen on your right. This was carried out only twice, once by the author and once by my colleague Geoff Burton, to estimate population size of three species, *P. icarus*, *N. acaciae* and *P. tithonus*. The disused mulberry terrace used for this experiment was about 80 x 15m. This method was used on the day *P. icarus* was marked in this meadow so that comparative information could be obtained.

TABLE IV Abundance of three species in a closed habitat (Douwes Method)

Species	Numbers recorded by J. F.		by G. B.
<i>Polyommatus icarus</i>	28		21
<i>Pyronia tithonus</i>	3		9
<i>Nordmannia acaciae</i>	11		10

Feltwell's Area Intrusion Method. This method involves observing a small defined area for periods of half an hour over several days and recording the numbers of each species visiting it. Unlike the other methods described this one requires that the observer is stationary. It is particularly useful for large butterflies which can be recognised easily but is less useful for blues, hairstreaks and skippers which are less easily distinguished at distance. The same groupings as used in the modified Pollard method described above were used for this method.

A note was made as to whether the insects would stop in the area for any reason, to feed, court, mate or oviposit, or would fly straight through without stopping.

The area chosen was a rectangle of about 32 x 17m surrounded partially on three sides by a ruined house, a disused house and an inhabited house. Observations were made from a terrace two metres above the ground and overlooking the area. Access to the area for butterflies was possible from virtually all directions and the rectangular area provided a sparse vegetation of Wild Carrot, *Daucus carota* L., mullein, *Verbascum* sp., Old Man's Beard, *Clematis vitalba* L., bramble, *Rubus* sp., Marjoram, *Origanum vulgare* L., Viper's Bugloss, *Echium vulgare* L. and Convolvulus *Convolvulus arvensis* L. The area was dominated by one large lime tree *Tilia* sp., while there were also Walnut (*Juglans regia* L.) and False Acacia (*Robinia pseudoacacia* L.) saplings present.

RESULTS

The results of the four methods are shown in tables I-V. In the mark and recapture experiments few or no recaptured insects were obtained in the closed

habitat, while, on the contrary, more recaptures were obtained in the open habitat, although these decreased over the next 17 days (table I).

The diurnal Lepidoptera noted by Pollard's method can be arranged in order of their frequency of sighting and it is clear from this that by far the most often encountered species was *Melitaea didyma* followed by the *Pieris* and *Coenonympha* groups (table II). *M. didyma* showed a distinct preference for the track habitat over the other five habitats sampled (table III).

When the three species were sampled by the zig-zag method of Douwes (1977) in the closed habitat, fairly consistent results were obtained for *P. icarus*, *N. acaciae* and *P. tithonus* when two independent samples were taken (table IV).

Twenty-three species of diurnal Lepidoptera were shown to have intruded into the defined area which was sampled for five hours by the Area Intrusion Method. Of these, the most frequently observed were the *Pieris* group, *I. podalirius*, *P. icarus* and *M. didyma* (table V).

TABLE V Abundance of butterflies (area intrusion method)
listed in order of greatest intrusions

Species	Numbers stopping	Numbers not stopping	Total
<i>Pieris</i> group	90	130	220
<i>Iphiclides podalirius</i>	7	45	52
<i>Polyommatus icarus</i>	29	23	52
<i>Melitaea didyma</i>	15	22	37
<i>Hipparchia semele</i>	3	20	23
<i>Pieris brassicae</i>	5	16	21
<i>Colias</i> group	8	12	20
<i>Maniola jurtina</i>	5	6	11
<i>Argynnis aglaja</i>	1	9	10
<i>Brintesia circe</i>	0	6	6
<i>Cynthia cardui</i>	0	5	5
<i>Limentis reducta</i>	2	3	5
* <i>Autographa gamma</i>	1	3	4
<i>Gonepteryx</i> group	0	4	4
* <i>Macroglossum stellatarum</i>	0	2	2
<i>Lasiommata megera</i>	2	0	2
<i>Satyrus actaea</i>	0	2	2
<i>Inachis io</i>	0	1	1
TOTAL INTRUSIONS			477

*Diurnal moths.

Butterflies and diurnal moths which did not stop at all in this area were the *Gonepteryx* group, *B. circe*, *C. cardui*, *S. actaea*, *I. io* and the Humming-bird Hawk Moth, *Macroglossum stellatarum*. Those species for which greater numbers passed through without stopping were the *Pieris* group, *P. brassicae*, *I. podalirius*, and *H. semele*, while *P. icarus* was the only species for which more stopped in the area than passed through without stopping (table V).

DISCUSSION

Professor T. R. E. Southwood has emphasised seven assumptions which should be satisfied when carrying out capture-recapture methods and in using the Lincoln Index (Southwood, 1975). Some of these, such as that marked animals should not be affected by the mark and that the mark should not fall

off, and that the capture of an animal once or twice does not affect its subsequent chance of capture, are almost impossible to monitor effectively in the field. Preliminary trials demonstrated that the Rymans adhesive spots were far too big for small butterflies, such as blues, skippers, hairstreaks and even the smaller whites, to enable them to fly. However, the spots did not appear to affect mobility of *I. podalirius* and did not seem to put them at any disadvantage during courtship chases and spirals; indeed marked individuals were equally often seen chasing unmarked individuals and being chased themselves.

Two other assumptions were more difficult to satisfy in these experiments; that is that the population is a closed one, and that there are no deaths and births during the course of the experiment. In the mark and recapture experiments on *N. acaciae* and *P. icarus* in the closed habitat it was unfortunate that on the second day of sampling most of the specimens were very fresh. This indicated that births had occurred rather than immigration, thus detracting from the usefulness of the results. The population size of *N. acaciae* therefore appeared infinite while that of *P. icarus* had a high Lincoln Index of 160 (table I). The fact that only 16 *P. icarus* could be found two days later after exhaustive searching, and that only two of these were marked, the remainder being fresh, indicated that births had taken place rather than immigration. This was also suspected as numbers of *P. tithonus* had appeared by this date (table IV). The absence of any marked *N. acaciae* on the second day was very noticeable and was thought to be due to fresh eclosions.

More recaptures of *I. podalirius* were made although this was in an open habitat. The Lincoln Index rises from 48 on 13th August to 86 on 14th and 110 on 17th calculated from total recaptures. This suggests migration, rather than births, because the dramatic decrease in the number of butterflies seen after the 17th August heralded the end of the flight season. The samples are too small after 13th to reveal a trend if only the previous day's recaptures are used for the index. Up to this date 68 specimens had been individually marked. If many more specimens were caught and marked over a much longer time period then Jolly's method, described in Southwood (1975), could be used to calculate the degree of immigration and emigration, but sufficient data for this was not available.

Mention has already been made in a previous paper (Feltwell, 1981) that one marked *I. podalirius* was recaptured 15 days later. Higgins & Riley (1975) reported that *I. podalirius* flies as a second brood during August-September, but here it appeared that the second brood finished in the third week of August. No *I. podalirius* were seen in September, although the weather was good. There is however, the possibility that the effect of the drought reducing the number of flowers had presumably shortened the lives of *I. podalirius*. It was pointed out by Scott (1973) that the life-span of temperate species is 7-12 days and that hot weather can decrease the life-span of certain species. In the present study, mark and recapture studies on *P. rapae* clearly demonstrated that one specimen lived eight days and there were two others which lived for five days.

Pollard's method is intended to give comparative information on the same species in the same area from year to year. The data collected during the two weeks can be presented to show the relative abundance of butterflies (table II) provided certain reservations are considered. The counts made may mean different things for different species. For instance for *M. jurtina* a count of 10 may mean a population of 100 in a given area whereas the same count for the Small Skipper, *T. sylvestris* may mean a population of 1000 in the same area. Presumably, only those butterflies which are known to have similar 'mobility patterns' can be compared but information on this is not available. Nevertheless, information recorded in this short period of time by Pollard's method does shed light on the abundance of butterflies and agrees well with the results from the

Area Intrusion Method which lists the same three species out of the top four as the most abundant butterflies on the wing (Tables II & V).

The information collected using this modified Pollard's method also gives important information about the distribution and habits of some butterflies. It was noticeable that the Spotted Fritillary, *Melitaea didyma* preferred the track road (Table III) and this was no doubt due to the abundance of wild flowers along its length. These butterflies seem to prefer to feed, court and bask in the sun in such areas. The diurnal Latticed Heath, *Semiothisa clathrata* (L.) (Geometridae: Ennominae) showed some tendency to fall off in numbers during the two weeks, so too did *P. brassicae*.

If data are accumulated by Pollard's method over the summer season then some idea of the timing of broods can be seen by expressing the data graphically. In this present study where the frequency of making observations has been telescoped into a much shorter time scale, a similar fluctuation in numbers can be seen. For instance, there are several cases where 'peaks' of various species are evident in the results of table II, e.g. *M. didyma*, *P. icarus* and *S. actaea* on the 24th August and *Coenonympha* group on the 30th August. As the weather was consistently good throughout these studies it is thought most likely that these peaks represent variations in brood cycles.

The area intrusion method provides information on abundance and behaviour of butterflies and diurnal moths. The most abundant species recorded by this method were the *Pieris* species which were more abundant by a factor of four than *I. podalirius* and *P. icarus* (table V). The differences in ratio of *I. podalirius* can be accredited to its preference for the hamlet situation where it continually exhibits patrolling behaviour. The high rating of *Coenonympha* species in Pollard's method and its absence in the area intrusion method is due to its abundance in the grassy areas through which the transect passed. Naturally the availability of foodplants or flowers for imaginal feeding will influence the type of species visiting an area and its behaviour once there. Wherever the area intrusion method is used the type of vegetation must be stated so that foodplants and attractive flowers can be correlated with visits from butterflies.

The area intrusion method can also give important information about the potential of an area to accommodate butterflies, a sort of carrying capacity, generally used by ornithologists to count birds on mudflats where there are plenty of worms for food. In this case one can say that in this defined area there were 477 intrusions by individual butterflies representing at least 23 species.

Observations made on butterfly movements through a defined area may also give information on the distribution of clones. An immediate application of this technique could be used, for instance on the monitoring of the boundaries of *M. jurtina* clones. Professor E. B. Ford was able to sort out the boundaries of *M. jurtina* clones in England on the basis of physical characteristics (Ford, 1975).

The seven species which did not stop at all in the area were the larger and stronger fliers (table V); typically *M. stellatarum* would fly through very rapidly and both *P. machaon* and *B. circe* would make intrusions without stopping. In fact all but two of all the species observed tended to pass through without stopping, *P. icarus* and *L. megera* being the exceptions. It would be tempting to suggest that those species which did not stop in the area at all would have greater territories to patrol than the less mobile species. In any event the species listed in table V could be listed in order of decreasing tendency to visit the area through which they passed. This could indicate those species most likely to colonise an area; in this case *P. icarus* and *L. megera* would be most liable to stop, followed by *M. jurtina*, *M. didyma* and the *Pieris* species. In further studies it might be useful to follow individual butterflies and to allocate them index values according to how long they dilly-dally and what they do in an area. Nevertheless, the information gained from this study of intrusion of butterflies may be

useful in predicting the rate of colonisation by butterflies of areas of disturbed ground such as freshly-landscaped motorway verges.

It was curious that greater returns of recaptures of *I. podalirius* were made in what was thought to have been an open population in an open habitat. Marked individuals were readily seen from quite a distance but the author was vigilant in making sure that he did not inadvertently preferentially select marked insects from unmarked ones, though there was always the tendency to do so. It would seem that *I. podalirius* spends much of its time in a closely defined area thus increasing the incidence of butterfly-observer encounters.

The results showed that a closed population of *I. podalirius* occurred within what appeared to be an open habitat, but the limits of the habitat were an invisible line drawn between the vegetation associated with habitations and the rough scrub of the countryside. The clear areas available for the patrolling behaviour of *I. podalirius* are man-made due to the regular grazing of sheep and goats, therefore in this sense *I. podalirius* is associated with human settlement. Dierl (1978) makes reference to *I. podalirius* flying 'in hilly areas', which would fit in with the above described area very well and Gómez-Bustillo and Fernández-Rubio (1970) stated that the butterfly can be found on the sides of hills, open spaces and open wooded areas.

ACKNOWLEDGEMENTS

My thanks are due to Geoff, Mark and Judith Burton and James Shepherd for helping with practical exercises and to Dr. E. Pollard and Dr. J. F. D. Fraser for commenting on the manuscript.

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Collecting permits sub-committee.—Council has set up a sub-committee to make personal approaches to authorities responsible for issuing collecting permits so as to resolve in a constructive way the problems reported by members. Anyone wishing to express an opinion or to seek assistance should contact the President or Messrs. B. Skinner or K. Evans.

FURTHER REMARKS ON THE LARVAE OF *AMPHIPYRA PYRAMIDEA* (L.) AND *A. BERBERA* RUNGS

by J.C.A. CRAIK

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In his excellent compilation, Haggett (1981) comments on the disagreement of the descriptions of the larvae of the above species given by himself (loc. cit.) and Henwood (1980) with those given by Carter (1969) and myself (1980). He states "Craik, rearing from three females, described *pyramidea* larvae similar to that of Carter's, and thus opposite of Urbahn and mine, while Henwood fully confirmed the results of Urbahn and me . . . As it is inconceivable that larval characteristics could switch so completely from one species to another, there must be doubts about the determination of their parents".

I must point out that both these statements are inaccurate, since to leave them uncorrected would be to add further unnecessary confusion to a situation which is already unclear. Firstly, I reared three larvae of *berbera* which resembled a *berbera* larva described by Carter, and it is presumably this resemblance which Haggett wished to point out. Secondly, the determination which Haggett doubts is not that of the parents, but of the imagines resulting from the larvae: both Carter and I reared undoubted *berbera* from wild-caught larvae which resembled each other but differed from the *berbera* larvae described by Haggett and by Henwood.

There is a genuine and profound disagreement here. I would like to offer an explanation which may serve as a working hypothesis until further observations have clarified the situation.

Both Haggett and Henwood describe fully grown *berbera* larvae as having legs (the three pairs of forelegs) which are "outwardly totally jet black". I have reared the larvae of both *berbera* and *pyramidea*, obtaining adults which were identified by examination of genitalia. The larvae of neither species had black legs; indeed, I have never seen *Amphipyra* larvae with black legs. My drawings, made from the living larvae, show that the leg colours of the two species were barely distinguishable, both being green with a few black or dark red spots. This fact was noted with particular care, since I was aware that others had used this criterion to distinguish the species. Moreover, Carter's description and photograph show that the legs of his *berbera* larva were not black but similar to those of my *berbera* larvae. Nevertheless I found clear differences between the species which I have described (Craik, 1980).

There can equally be no doubt that Haggett reared *berbera* larvae which did have black legs. Both sets of observations have been independently confirmed. Haggett's by Urbahn (1969) and by Henwood, Carter's by myself. Therefore it seems that larvae of *berbera* exist in two forms, one with black legs, one with mainly green legs. It is possible that *pyramidea* larvae may also exhibit a dimorphism.

There is also uncertainty about the spiracles. Haggett (p. 81) describes the spiracles of both species as "thickly ringed in black". Urbahn describes the spiracles of *berbera* as completely black. I described the spiracles of *berbera* as having a central white area three times as broad as the black border.

These are matters that I am no longer able to investigate, as I now live and work outside the geographical range of these species. However, I urge lepidopterists living within that range (southern and central England, all of Wales?) to rear either or both species, to make detailed observations on the larvae, and to identify the resulting moths by examination of the genitalia. I suggest that particular attention should be paid to the colour of the legs, measurement of the width of

the mid-dorsal line, and the relative extent of the black and light areas of the spiracles (Craik, 1980). I would be happy to send copies of that paper to anyone wishing to investigate this problem. I would also recommend as essential reading the description and illustrations given by Haggett; his careful observations and meticulous attention to detail are quite unsurpassed. Resolution of these contradictions would be a contribution to biology of considerably greater value than the pursuing and collecting of rarities.

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Forcing development of Lepidoptera.—The larvae of some species can readily be brought through hibernation, but the losses amongst the hibernating larvae of many species are unacceptable, however much care is taken. It is beneficial if the insects can be induced to complete their metamorphosis without hibernation. It is sometimes said that the resulting imagines are of sub-standard size. I have known this to be so with the Scarce Burnished Brass, *D. chryson* (Esp.), a particularly difficult larva to overwinter. However, this was not the case with the three subjects of this note; the imagines of two of them were of above average size.

Idaea contiguaris (Hüb.), Weaver's Wave. 42 ova were obtained from a moth taken in N. Wales on 13.vii.1981. My companion and I apportioned these between us. My resultant larvae prospered feeding on Knotgrass, *Polygonum aviculare* L. I kept them in darkness at a constant temperature of 27°C and 19 surviving larvae pupated by 15th August. By 26.viii ten moths had emerged and I obtained three pairings. The remaining nine pupae hatched during the next week. Many ova were laid and given to friends. I kept 60 for myself and these started to hatch on 4.ix. I fed this brood on dandelion, *Taraxacum officinale* Weber. I retained 15 larvae for myself and later inadvertently changed the pabulum to Smooth Sow Thistle, *Sonchus oleraceus* L. When this plant is very small the fresh leaves look very like those of dandelion. Their edges are, however, spiny. The larvae lived, day and night, at a steady 27°C and the first pupated on 2nd October. The moths of this brood were slightly smaller than their parents and the emergence period was longer. The first moth appeared on 10.x and the last on 22.x. I did not attempt to obtain further pairings.

Some years ago I had spent some time in April searching for Weaver's Wave larvae after hibernation. I searched the various foodplants given by South and Meyrick, including Navelwort, *Umbilicus rupestris* (Salisbury), without success. Having reared the larvae, it is now obvious that they do not rest on the foodplant, except when first hatched. They cling to the surrounding stones or rock and feed from there.

Idaea fuscovenosa (Goeze), Dwarf Cream Wave. On 24.vii.1981 I took a female Dwarf Cream Wave and she laid six ova. From these I obtained five larvae between 3rd-6th August. I fed them on dandelion and kept them at 27°C. By 25.viii I had four larvae remaining; two nearly fully grown, but two remaining very small, though still eating. One larva pupated on 7.ix, emerging on 17.ix. A

second pupated on 16.ix and emerged on 27.ix. The remaining two larvae were obviously not going to become fully grown before winter. Early in October I released them to the wild. The two moths were both females of average size.

Diarsia dahlia (Hübner), Barred Chestnut. On 1.ix.1981 I received 12 newly hatched larvae from ova from a Surrey moth. I was advised to feed them on dock. The larvae of this species, too, hibernate when quite small, so I determined to subject them to the same 27°C treatment in darkness that had been so successful with Weaver's Wave.

The larvae grew steadily and by 27th October the first pupa was formed; by 12th November the first moth, a male, emerged. In all I had nine pupae, the last moth, a female, emerging on 19.xi. The females were considerably darker than the males and had a pale 'square spot' reniform showing up well. The males showed no stigmata. All specimens, except for one, were above standard size. I take standard size to be the average of the measurements given by Meyrick; in this case the average of 32.42 mm equals 37 mm.

I do not know whether the full emergence I had from the pupae of these three species was due to the fact that I kept the interior of the boxes moist. 27°C might otherwise cause the pupae to dry up. —E.C.L. Simson, Pine Corner, 4 Durnford Close, Chilbolton, Stockbridge, Hants, SO20 6AP.

BENHS Meeting 25.vi.1981.—*Exhibits.* Dr. A.A. Allen: *Ophion ventricosus* Grav. (Hym: Ichneumonidae) from Pluckley, Kent, flying in early evening 29.v.81; instantly recognisable by its black markings and heavily-infumated wings. Mr. K.G.W. EVANS: a female Common Wasp *Vespa vulgaris* (L.) which had failed to reach more than 1 m height in repeated attempts to fly off the ground at 11 a.m., Addiscombe, Surrey. The abdomen was found to be completely dry and empty.

The season. Mr. R.F. BRETHERTON had continued to record very few moths from his Bramley, Surrey light trap and thought the season to be very late. Mr. J.M. CHALMERS-HUNT had found a remarkable absence of butterflies in the woods of northern France. Mr. R. TUBBS was of the opinion that the very bad weather in July 1980 was responsible for bad egg-laying conditions and that this had resulted in low butterfly populations this year.

Mr. G. PRIOR talked on 'Observations on breeding the Eupitheciini'.

BENHS Meeting 23.vii.81.—*Exhibits.* Mr. J.M. CHALMERS-HUNT: (1) A live *Sitichroa palealis* (D. & S.) (Lep: Pyralidae) from Dartford, Kent, one of many seen 16.vii. (2) A live *Coleophora deauratella* Lienig & Zell., which could be swept abundantly from red clover and lucerne in late afternoon at Greenhithe, Kent, 15.vii. Mr. P. SOKOLOFF: (1) Freshly emerged *Apodia bifractella* (Dup.) bred from seedheads of fleabane (*Pulicaria dysenterica*) collected nine months previously from Orpington; (2) Detritus of Sea Aster (*Aster tripolium*) seedheads showing masses of pupal cases of *Eucosma tripoliana* (Barrett) of which moths from Benfleet, Essex, were shown. Mr. E.H. WILD had shown a small insect at the previous meeting for identification. Reference to the British Museum had now established it to be a rare psocopteron, *Trichadenotecnum fasciatum* (F.), the larvae of which feed on bark of a range of trees. The locality was Staffhurst Wood, Surrey, 7.vii.81.

Mr. R. TUBBS reported that in a New Forest ride he had seen what he at first took to be a very large *M. galathea*, but it turned out to be a remarkable aberration of *Argynnis paphia* (L.) with the ground colour almost white [see annual exhibition]. Mr. Chalmers-Hunt observed that a rather poor specimen of this aberration was in the R-C-K-collection. Mr. Tubbs had also seen in the New Forest a ♀ *Aphantopus hyperantus* (L.) in cop with a ♂ *Maniola jurtina* (L.).

There followed a discussion on 'Moths and Moth Trapping'.

EREBIA EPIPHRON KNOCH (LEP: SATYRIDAE) REARED ON A TWO YEAR LIFE-CYCLE

by A.S. WHEELER

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In July 1978, I visited the Ben Lawers Nature Reserve, having obtained permission at very short notice, to collect one female of *Erebia epiphron* Knoch in an attempt to rear a few specimens. 16th July was rather late in the month, but the weather was good and I had no difficulty in netting two females soon after arriving on the reserve in early afternoon. The stronger butterfly was kept.

I returned home on 20.vii and eggs were laid on and after 22.vii. Ten eggs hatched between 30.vii and 5.viii. One larva died very soon and another in mid-September. Up to this time, the larvae had been kept in a glass-topped tin and fed on the predominant grass from the mountain-side – thought to be *Mat Grass* *Nardus stricta* L.

On 29.x, following consultations at the Annual Exhibition, on the previous day, the surviving eight larvae were placed on the growing grass from Ben Lawers and they were not seen again until four of them reappeared between 4 & 27.iv.79, by which time their winter quarters needed replacement. The larvae were none too ready to be moved and one or two returned to the pot of nearly dead grass, so they were provided with some *Deschampsia flexuosa* (L.) from Headley Heath, Surrey.

The larvae were seen from time to time, feeding higher on the blades morning and evening, in the sunshine. They were not seen often after dark. The last day three were seen together was 17.vii.79, a day after the anniversary of capturing the female. At this stage, I was advised to discard them, by someone who is not a member of this society, but who had tried and failed to breed the species from eggs at an earlier date. I decided to persist. On the afternoon of 25.x two larvae, about a half inch long, were seen for the last time in 1979. These two larvae survived their second winter, reappearing on 8 & 13.ii.80 and the larger of them was seen feeding on 23.ii. Both of them were smaller than last autumn. Only one larva was seen at any time from that day until 10.iv, when freshly potted grass from Headley Heath was provided and the two larvae were transferred. On 14.v another supply of grass was required. Both larvae had been growing up a bit quicker lately, but on 2.vi I noted in my diary that "the smaller larva had not been seen for a week or more and may have pupated" and the other disappeared within a few days.

During all the time that the larvae were on the pots of grass, the grass was sprinkled with a little water, once or twice a day according to the temperature, except when it would have frozen.

On 12th June 1980, a female emerged, followed by a male four days later. The pupae had not been seen, nor could the empty cases be seen after emergence until the matted grass was carefully pulled apart. One dropped out before the situation was seen, but the other was found three inches up the blades, which were loosely spun together. It was head upwards and the old larval skin was caught up just below. Both pupal cases have been kept as described.

I record my thanks for the speed with which permission to collect was granted by Dr. Rosalind A.H. Smith, Assistant Regional Officer, Perth and Kinross District, Nature Conservancy Council.

Pabula of Helix pomatia L., Edible or Roman Snail. – A snail taken from Kemsing, Kent on 2.v.81 had fed upon these items by 25.vi.81: *Iris* sp., *Beta*, *Chenopodium*, *Lactuca serriola*, *Rumex obtusifolius* L., *Hedera helix* L., *Hydrangea*, *Laburnum anagyroides* Medic., *Prunus spinosa* L. and *Crataegus*

monogyna Jacq., old Cheddar cheese and damp lining-paper. This mollusc is of local occurrence throughout southern and central England, especially on chalk and less commonly on limestone. It was supposedly introduced by the Romans, but fossil deposits exist and subfossil remains are fairly common in some places. — M.J. Newcombe.

BENHS Field Meeting: Lynford Carriageway, Thetford Forest, 6.vi.1981. Leader: J. Fenn.—Five members joined the leader in the lime avenue on an evening cool after earlier heavy rain.

Before setting up the lights the remaining hours of daylight were spent in searching for fresh *Abraxas sylvata* (Scop.) resting on foliage beneath Wych Elms.

Recent felling of adjacent conifer plantations must have reduced the numbers of some of the hoped-for pugs, but nevertheless six species duly appeared.

Among the few micro moths were *Tinea semifulvella* Haw. and *Epinotia rubiginosana* (H-S.).

Fifty-one macro moths were recorded, the most interesting being: *Euphyia unangulata* (Haw.), *Eupithecia exigua* (Hüb.), *E. egenaria* H-S. (well worn), *E. vulgata* (Haw.), *E. indigata* (Hüb.), *E. lariciata* (Freyer), *E. subfuscata* (Haw.), *Abraxas sylvata* (Scop.), *Lomographa bimaculata* (F.), *Ptilodontella cucullina* (D. & S.), *Nola confusalis* (H-S.).

BENHS Field Meeting: Bricket Wood, Herts, 2.xi.1980. Leader: J.M. Chalmers-Hunt.—This meeting was devoted mainly to the study and collection of leaf mining Lepidoptera of which a large number of species were recorded during the day.

About twelve members made their way from Bricket Wood station to what was (some years ago) a wide open ride at the entrance of the wood, now somewhat overgrown. Here was discovered plants of *Hypericum* with spinings made by the larvae of *Calybites auroguttella* (Steph.) and leaves of the same plant mined by the larvae of *Fomoria septembrella* (Staint.).

Beyond the ride the more open part of the wood was reached. This area contained bracken, scrubby heather, *Juncus* spp., scabious, numerous birch trees and seedlings. Around the edges grew oaks, willows, hazel, aspens, hawthorn, beech etc. Members retired to the Fox and Hounds for refreshment. As the open area proved the more interesting the party returned to it for the afternoon. It was in this locality some years ago that larvae of *Coleophora caespitiella* Zell. were taken and the moth bred out. On this occasion the species was not found.

Abbreviations in the following list of Lepidoptera are:

F = frequent, C = common, A = abundant.

Ectoedemia argyropeza (Zell.) A in fallen leaves of aspen.

E. intimella (Zell.) One tenanted mine in leaf of *Salix caprea*.

E. angulifasciella (Staint.) Tenanted and vacated mines C on rose.

E. atricollis (Staint.) Mines, a few still tenanted, F on hawthorn.

E. argentipedella (Zell.) Two vacated mines on birch.

E. mediofasciella (Haw.) Four vacated mines on birch. *New to VC 20.*

E. subbimaculella (Haw.) Tenanted mines scarce on oak.

Stigmella aurella (F.) Tenanted mines FC on *Rubus* spp.

S. marginicolella (Staint.) Tenanted mines F on elm.

S. speciosa (Frey) One vacated mine on sycamore.

S. plagicolella (Staint.) Tenanted mines C on sloe.

S. salicis (Staint.) Tenanted mines C on *Salix* spp.

S. obliquella (Hein.) One vacated mine on *Salix babylonica*.

S. trimaculella (Haw.) Several vacated mines on poplar.

S. floslactella (Haw.) Tenanted mines on hazel.

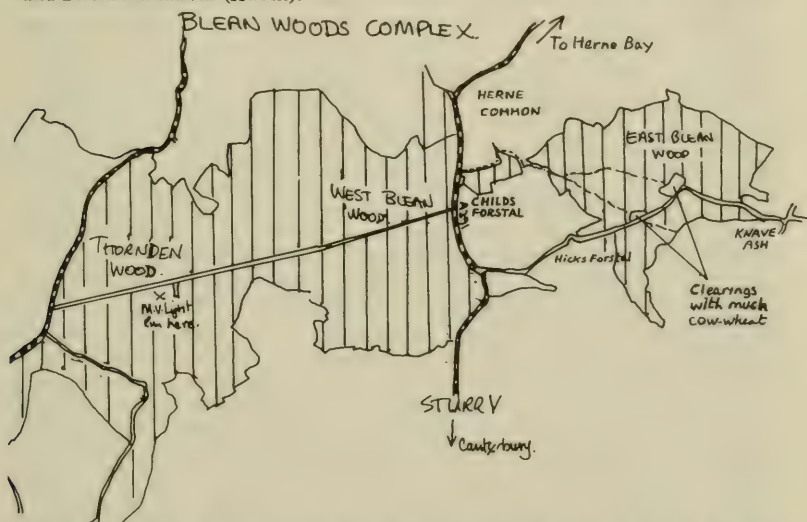
- S. atricapitella* (Haw.) Vacated and a few tenanted mines on oak.
S. auritella Skala reared from mines on *Salix auriba*.
S. ruficapitella (Haw.) Tenanted mines C on oak.
S. basiguttella (Hein.) Two vacated mines on oak.
S. anomalella (Goeze) Tenanted mines C on rose.
S. hybnerella (Hübner) Vacated mines C on hawthorn.
S. oxyacanthella (Staint.) Vacated mines F on hawthorn.
S. betulicola (Staint.) Tenanted and vacated mines F on birch seedlings.
S. microtheriella (Staint.) Tenanted and vacated mines F on hazel and hornbeam.
S. luteella (Staint.) One tenanted mine on birch.
S. confusella (Wood) Several vacated mines on birch.
Tischeria marginea (Haw.) A few tenanted and vacated mines on *Rubus*.
Tischeria ekebladella (Bjerk.) Several tenanted mines on oak.
Heliozela hammoniella (Sorhagen) (*betulae* (Staint.)) One vacated mine on birch.
Psyche betulina (Zell.) Three living and one dead larvae on trunk of birch. Specimens were eventually bred out, confirming identity.
Lyonetia clerkella (L.) Vacated mines C on birch and hawthorn.
Bucculatrix ulmella Zell. A cocoon on trunk of hornbeam (adjacent to oak).
 None were seen in the wood itself.
Caloptilia stigmatella (F.) Larval cones on poplar and willow; one cocoon.
Parornix betulae (Staint.) Mines and folded leaves, mostly vacated, C on birch.
P. anglicella (Staint.) Vacated mines and larval cones on hawthorn.
Phyllonorycter heegeriella (Zell.) Mines C on oak.
P. tenerella (Joan.) Mines F on hornbeam.
P. quercifoliella (Zell.) Mines on oak (Vacated 1st gen. determined)
P. messaniella (Zell.) Mines on oak and hornbeam.
P. oxyacanthae (Frey) Tenanted mines C on hawthorn.
P. pomonella (Zell.) Tenanted mines A on sloe.
P. corylifoliella (Hübner) Tenanted mines on hawthorn.
P. coryli (Nic.) Tenanted mines C on hazel.
P. quinnata (Geoff.) Tenanted mines C on hawthorn.
P. anderidae (Fletcher) Tenanted mines F on birch seedlings. Adults reared.
P. lautella (Zell.) Tenanted mines C on oak seedlings.
P. schreberella (F.) Tenanted mines C on elm.
P. ulmifoliella (Hübner) Tenanted mines C on birch.
P. nicellii (Staint.) Several tenanted mines on hazel.
P. sylvestra (Haw.) Tenanted mines C on maple.
P. geniculata (Rag.) Tenanted mines F on sycamore.
Phyllocnistis unipunctella (Steph.) A few vacated mines on poplar.
Glyphipterix simplicella (Steph.) Pupal mines in stems of *Dactylis*.
Swammerdamia caesiella (Hübner) One larva on birch.
Coleophora gryphipennella (Hübner) Larval cases F on rose.
C. fuscocuprella H.-S. Several larval cases on birch.
C. viminetella Zell. Two larval cases on *Salix aurita*.
C. violacea Stroem Larval feeding on sloe.
C. potentillae Elisha. Several larval cases on birch and *Potentilla erecta*.
C. ardeapennella Scott. One larval case (old) fixed for pupation on oak leaf.
C. alticolella Zell. Larval cases on *Juncus* spp.
Acleris rhombana (D. & S.) One adult.
A. notana (Don.) Larvae on birch (confirmed by RWJU).
Ancylis mitterbacheriana (D. & S.) One larva on oak.
Colotois pennaria (L.) One adult.
Agriopsis aurantiaria (Hübner) One adult.

Various other mines were found on blackthorn and willow, but could not be determined. Adults would have to be bred to confirm the identity.

BENHS Field Meeting: Pamber Forest, Hants, 30.v.1981. Leader: B. Skinner. — Twenty members and friends attended this night meeting. Cars were not taken into the central area of the forest as most of the rides were under water after the above average rainfall during the preceding weeks. Fortunately the many access points around the perimeter of this forest afforded a variety of suitable trapping sites without having to venture too far along the water-logged pathways. Despite a certain amount of cloud cover the temperature remained low and although a total of eighty seven species of macro-lepidoptera were recorded, individual trap catches were well below average for this time of year. The more interesting species were *Drepana cultraria* (F.), *Eupithecia plumbeolata* (Haw.), *Euchoeca nebulata* (Scop.), *Clostera curtula* (L.), *Eilema sororcula* (Hufn.), *Nola confusalis* (H.-S.), and *Acronicta alni* (L.).

Our thanks are extended to the Pamber Forest Management Committee for permission to study insects in this newly designated nature reserve.

BENHS Field Meeting: Blean Woods, Kent, 13/14.vi.1981. Leaders: E. S. Bradford and J.M. Chalmers-Hunt. — 30 to 40 members and friends attended this two day and one night field meeting. The weather on both days was all that could be desired, it being dry with little wind and pleasantly warm with continuous sun. The party assembled at the Fox and Hounds Inn, and proceeded to the reserves at Childs Forstal Wood and East Blean, owned by E. S. Bradford and the Kent Trust for Nature Conservation respectively, and after lunch Thornden and West Blean Woods were visited. On entering W. Blean, a fresh male Heath Fritillary was spotted, but it was not until the following day that this butterfly was observed in any numbers. One species we hoped to see was the local and very attractive Tortricoid *Olethreutes arcuella* Clerck, and Mr. John Fenn was fortunate enough to take this as it was flying in the sun in East Blean. That night, lights were operated until the early hours of the 14th in that part of Thornden near to or adjoining Clowes Wood, and a number of good species were taken including *Esperia oliiviella* (F.), *Telechrysis tripuncta* (Haw.), *Epinotia rubiginosana* (H.-S.) and *Selenia lunularia* (Hübner.).



The following day proved so far the warmest and sunniest day of the year, and we were delighted to encounter the Heath Fritillary (*Melitica athalia* Rott.) in numbers, both sexes of which were flying freshly emerged in a clearing in

Thornden. In the same area, in *Epilobium angustifolium* stems, numerous galls of *Mompha nodicolella* Fuchs provided a treat for the majority of microlepidopterists present who were in need of this local species.

Mr. M. J. Newcombe examined in Thornden Wood, a Slow-worm *Anguis fragilis* (L.), and also noted there in a fire-pond, Common Newts *Triturus vulgaris* (L.). We are grateful to Mr. Newcombe for the list of 'other Orders' recorded during the meeting and to Messrs. N. F. Heal and M. Hadley for many of the Lepidoptera.

MYRIAPODA: *Lithobius forficatus* (L.). DERMAPTERA: *Forficula auricularia* L. ORTHOPTERA: *Meconema thalassinum* (Deg.) Oak Bush-cricket. Nymphs on hornbeam and oak. *Leptophyes punctatissima* (Bosc) Speckled Bush-cricket. *Pholidoptera griseoptera* (Deg.) Dark Bush-cricket. *Tetrix undulata* (Sowerby). NEUROPTERA: *Chrysopa carnea* Stephens A common lacewing, taken in Child's Forstal.

HEMIPTERA-HETEROPTERA: *Anthocoris nemoralis* (F.), *A. nemorum* (L.), *Calocoris norvegicus* (Gmel.) Nymphs common on nettle, *Capsus ater* (L.), *Corixa punctata* (Illiger) In water-filled ditch in Child's Forstal, *Cylloceria hibernica* (L.) Swept from oak, *Cymus melanocephalus* Fieb. Swept from *Juncus effusus* in Thornden Wood, *Dicyphus epilobii* Reut., *Dolichonabis limbatus* (Dahlb.), *Eysarcoris fabricii* Kirkaldy On *Salvia horminoides*, *Gerris* sp. Two seen but not caught on water-filled ditch, *Leptopterna dolabrata* (L.), *Liocoris tripustulatus* (F.), *Megaloceraea recticornis* (Geoff.), *Phytocoris ulmi* (L.) Nymph swept from bramble, *Phylus melanocephalus* (L.), *Psallus perissi* (Wagner), *Dryophilocoris flavoquadrinaculatus* (Deg.).

Key: T Thornden, E East Blean, W West Blean, C Child's Forstal.

LEPIDOPTERA: *Micropterix aruncella* T, *Hepialus hecta* T, *H. lupulinus* T, *Nematopogon swammerdamella* TC, *N. panzerella* W, *Nemophora degeerella* TEC, *Psyche casta* cases EW, *Taleporia tubulosa* case E, *Bucculatrix ulmella* W, *Phyllonorycter harrisella* TC, *P. messaniella* C, *P. trifasciella* W, *Argyresthia pygmaeella* W, *A. albistria* C, *A. retinella* W, *Coleophora serrata* T, *C. milvipennis* cases on birch C, *Alabonia geoffrella* TEC, *Tubuliferola subochreella* C, *Schiffermuelleria tinctella* W, *Neofacultea ericetella* W, *Mompha raschkiella* T, *Anthophila fabriciana* TE, *Glyphipterix simplicella* T, *Acrolepia pygmaeana* T, *Cydia nigricana* TE, *C. fagliglandana* T, *Rhyacionia pinivorana* T, *Epiblema uddmanniana* T, *E. cynosbatella* T, *E. turbidana* T, *Epinotia tetraneura* T, *Ancyliis obtusana* TEW, *E. bilunana* T, *A. diminutana* T, *Apotomis capreana* T, *Bactra lanceolata* TW, *Lobesia reliquana* T, *Orthotaenia undulana* TW, *Olethreutes lacunana* T, *Choristoneura hebenstreitella* T, *Eulia ministrana* TW, *Ptycholoma lecheana* TC, *Pseudargyrotoza conwagana* TE, *Lozotaenia subocellana* TW, *Tortrix viridana* TW, *Chrysoteuchia culmella* (hortuella) T, *Leioptilus tephraedactyla* TEW, *Scoparia ambigua* T, *Anania funebris* T, *Opsibotys fuscalis* T, *Rotruda carlinella* T, *Homeosoma sinuella* T.

Boloria euphrosyne T, *Mellicta athalia* T, *Pararge aegeria* TCW, *Polygonia c-album* T, *Coenonympha pamphilus* TE, *Lasiommata megera* WE, *Gonepteryx rhamni* T, *Pieris brassicae* E, *P. rapae* E, *Polyommatus icarus* T, *Callophrys rubi* E, *Lycaena phlaeas* E, *Macrothylacia rubi* TW, *Drepana falcatoria* T, *Tetheella fluctuosa* T, *Geometra papilionaria* T, *Jodis lactearia* W, *Petrophora chlorosata* TE, *Scopula immutata* TW, *S. floslactata* T, *Xanthorhoe montanata* TEC, *Chloroclysta truncata* T, *Ecliptoptera silacea* C, *Electrophaes corylata* TC, *Eupithecia plumbeolata* TW, *E. subfusca* T, *Asthena albulata* TW, *Lomaspilis marginata* TW, *Semiothisa notata* TW, *Petrophora chlorosata* T, *Plagodis pulveraria* T, *P. dolabraria* T, *Serraca punctinalis* T, *Odontoptera bidentata* T, *Ectropis extersaria* T, *Pseudopanthera macularia* TW, *Aethalura punctulata* T, *Cabera pusaria* T, *Lomographa temerata* T, *Campaea margaritata* TE, *Deilephila elpenor* T, *Smerinthus ocellata* T, *Dasychira pudibunda* T, *Spilosoma luteum* T, *S. lubricipeda* T, *Agrotis exclamationis* T, *Ochropleura plecta* T, *Phlogophora meticulosa* T, *Diarsia mendica* T, *Oligia strigilis* T, *O. latruncula* T, *Autographa gamma* T, *Lithacodia pygarga* T, *Bena fagana* T.

1981 ANNUAL EXHIBITION

Chelsea Old Town Hall — 24th October 1981

Reviewers are: R. S. Tubbs (British butterflies), B. F. Skinner (British macro moths), J. M. Chalmers-Hunt (micro moths), R. F. Bretherton (foreign macrolepidoptera), P. J. Chandler (Diptera and Odonata), I. McClenaghan (Coleoptera), and P. A. Sokoloff (illustrations).

The number of novel forms that have not been illustrated in the Proceedings before was much down on the usual. This reflection of a poor season is especially to be regretted because the experiment was undertaken of producing a colour transparency of the best forms selected by A. D. A. Russwurm and the editor. We hope to publish this later and to make it an annual replacement for the very unsatisfactory monochrome plates of the past. The change is however dependent on obtaining satisfactory reproduction at a price much less than that commonly asked for single plates and may involve publishing a group every few years.

The practical difficulty of assembling the selected items and photographing them under conditions far from the peace of a studio was exacerbated on this occasion by late arrivals and early departures necessitated by the clogage of central London by a political demonstration. We think it necessary for the safety of the specimens and the maintenance of high quality reproduction to photograph in colour elsewhere and to return the specimens later, as was done when the British Museum undertook photography for us. D. A. Wilson was again our photographer this year. The editor will welcome comments on this matter.

BRITISH BUTTERFLIES

Since the publication by Collins in 1945 of 'Butterflies' by Professor E.B. Ford F.R.S., which emphasised the significance of genetics in butterfly breeding, many amateur entomologists have developed a growing desire to know more about the biology of their aberrations. They want to find out what causes the aberration and the biological relationship of the different forms. It is encouraging, therefore, that many of the exhibits this year reveal serious research in the field.

BAILEY, K.E.J.—A number of aberrations including a series of *Vanessa atalanta* (L.) and *Polygonia c-album* (L.), both the result of low temperature experiments on the early pupal stage. Two of the *atalanta* resembled ab. *klemensiewiczzi* Schille, a form occasionally found in nature but known for many years as the artificial product of treatment at low temperatures. One *Ladoga camilla* (L.) ab. *obliterae* Robson and Gardner and one ab. *nigrina* Weymer were shown. These are probably caused by the same gene, but further research is required.

BARRINGTON, R.D.G.—*Lysandra coridon* (Poda), various aberrations. *Maniola jurtina* (L.) ab. *postmultifidus* Lipscomb. The exhibitor has obtained eggs from this aberration and hopes to breed several generations in order to work out its genetic basis.

CRASKE, R.M.—*Hamearis lucina* (L.) two male ab. *leucodes* Lamb, an uncommon form with pale ground colour. *Boloria selene* (D. & S.), two males of an aberration which recurs fairly regularly in the same wood in Sussex — undersides of hindwings rayed with silver from the basal areas — a form worthy of breeding. *Maniola jurtina* a male ab. *anomnata* Verity and a female ab. *excessa* Leeds.

ELLIOTT, B.—Butterflies taken on St. Mary's, Isles of Scilly — *Pararge aegeria* (L.) ssp. *insula* Howarth — the light markings are tawny-orange, nearer to that of the nominate subspecies *aegeria*, which occurs in south-west Europe. Also *Maniola jurtina* ssp. *cassiteridum* Graves — this is a very boldly marked and brilliant form.

HARBOTTLE, A.H.H. — A female *Maniola jurtina* ab. *pallens* Mieg — has the reddish yellow half band on the forewing paled to ivory-white. Breeding from these whitish *jurtina* (which, of course, are not albinos) would elucidate the relationship of the various pale forms. Also *Lysandra bellargus* Rott. ab. *post caeca* B. & L.

HARMER, A.S. — Various aberrations including *Lysandra bellargus* ab. *semiceronus* Tutt (this blue form of the female is very variable and is genetically quite different from the blue form of *L. coridon* ab. *tithonus* Meigen which is a sex-linked recessive), a male *Hipparchia semele* (L.) ab. *holanops* Brouwer, a male *Maniola jurtina* ab. *anommata* Verity and a female *Coenonympha tullia* Müller ab. *cockaynei* Hopk. which has additional white patches on the hindwings.

HOLDAWAY, P.J. and WALKER, R.K. — A selection of aberrations, the most noteworthy being *Coenonympha pamphilus* (L.) ab. *caeca* Oberthür. This is a constantly recurring form and it would be valuable for someone to check to see if it is a simple recessive.

JEFFERY, C.W. — *Ladoga camilla* ab. *obliterae*. (The fourth specimen of this form in the exhibition) and a very unusual melanic male *Hesperia comma* (L.)

PICKLES, A.J. and C.T. — Butterflies taken in western Ireland, August 1981, including *Maniola jurtina* ssp. *iernes* Graves taken Co. Clare. These Atlantic coast *jurtina* are very fine, larger and more strongly marked than typical ssp. *iernes*, originally described from specimens from Kerry. Also shown were *Hipparchia semele* F. *clarencis* de Lattin (Co. Clare) and ssp. *hibernica* Howarth (Co. Kerry).

PITTIS, Rev. S.C. — Amongst a selection of Hampshire and Dorset butterflies were *Ladoga camilla* ab. *obliterae* and a male *Hipparchia semele* ab. *monocellata* Lempke. The latter aberration occurs in the stock when breeding from ab. *holanops* Brouwer and is therefore genetically related.

LIPSCOMB, Major Gen. C.G. — Series of *Maniola jurtina* illustrating the difference between ab. *posttauroalancia* Leeds and ab. *postmultifidus* Lipscomb. In the latter the lower half of the band on the underside of the hindwings is broken up into well separated segments (see Lipscomb, *Entomologist's Rec. J. Var.* 92:205).

REVELS, R.C. — A drawer of *Hipparchia semele* showing the results of breeding from the ab. *holanops* Brouwer ab. *monocellata* Lempke complex from 1975 to 1981. The gene which produces these forms also produces a striking rayed appearance in the light coloured bands. Ab. *holanops* itself is caused by a recessive gene, but appears to be influenced by modifying factors. The 1981 emergence in this stock also included some forms accentuating the yellow areas. An exhibit which well illustrated the valuable information obtained by breeding several consecutive generations (see Revels, *Entomologist's Rec. J. Var.* 90:159). A second drawer of various aberrations included a very pale cream form of *Pyronia tithonus* (L.), a female from which eggs have been obtained for breeding.

RUSSWURN, A.D.A. and MIDDLETON, H.G.M. — A selection of aberrations including *Maniola jurtina* female ab. *antiexcessa* Leeds, ab. *parvipuncta* Leeds and ab. *antialba* Leeds with and without *pupillatanulla* Leeds all taken on Portland. A second exhibit consisted of *Pararge aegeria* approaching the coloration of spp. *tircis* Butler taken on Guernsey C.I. These, like those taken from the Isles of Scilly and exhibited by B. Elliott, have the light markings darkened to a tawny-orange.

TUBBS, R.S. — A drawer of *Hipparchia semele* showing several generations bred from ab. *holanops* Brouwer and ab. *monocellata* Lempke between 1976 and 1981. Also a male specimen of *Argynnis paphia* L. ab. *cifkai* Silbernagel taken by E. M. Tubbs. In this aberration the ground colour is white. There are only three known previous British specimens: (1) taken Maidstone 1860 and figured by Mosley (now BM(NH)), (2) New Forest 1901 taken by Ford (now

BM(NH)) and (3) taken by Butterworth 1913 (now owned by Smart of Bramber, Sussex). It is probable that this aberration is caused by a recessive gene and the exhibitor hopes to breed from females taken in the same locality.

YOUNG, L.D.—Aberrations of *Plebejus argus* (L.) from Surrey and Hampshire heathlands 1977-1981 which included one fine ab. *juncta* Tutt with black lines extending inwards from the inner edge of the margins.

BRITISH MACRO MOTHS

Despite the unfavourable season the number of individual exhibits of this group was only just below the average, however as most of these were composed of species obtained from their well known localities the following comments will be restricted to the more important records.

A number of specimens and larvae of *Peribatodes secundaria* (D. & S.), a Geometrid species new to the British list, were shown by Messrs. R. FAIRCLOUGH, T.W. HARMAN, and B. SKINNER. A short series of *Deltote bankiana* (F.) from near Sandwich, Kent, was taken on 4.viii.1981 by N.F. HEAL; previously thought to be a probably immigrant only in Kent, but the numbers which came to light on this and subsequent occasions indicate the probability of it being a resident species. Several examples of a dark race of *Eumichtis lichenea* Hübn. from south Hampshire were exhibited by Messrs. E.H. WILD, A.J. and C.T. PICKLES. The second record from Essex of *Eupithecia phoeniceata* (Ramb.), taken at Tilbury on 16.ix.1981 by C.G. PENNEY, indicates the northward spreading trend of this species.

Outstanding aberrations were few, the more unusual were a male *Boarmia roboraria* (D. & S.) with melanic cross banding and a *Polyphoca ridens* (F.) with enlarged pale markings on the forewings, both taken in the New Forest by Rev. S.C. PITTIS, an unusual pale variety of *Electrophaes corylata* (Thunb.) shown by B.R. BAKER on behalf of Dr. P. BRIGHT; an albino *Eupithecia virgaureata* Doubl. bred from Yorkshire stock by J.L. FENN, and an asymmetrical example of *Mimas tiliae* (L.) ab. *brunnea* Bartel from the R.W. WATSON collection.

Migrant captures for 1981 included two specimens of *Trichoplusia ni* (Hübner.), one from Portland, Dorset on 5.ix by N.M. HALL, the other from the Lizard, Cornwall in August by B. ELLIOT; two *Agrius convolvuli* (L.) from Leigh, Surrey in late September by R. FAIRCLOUGH; and from Highcliffe, Hampshire single examples of *Mythimna unipuncta* (Haw.) on 20.ix and *Mythimna vitellina* (Hübner.) on 4.x both taken by E.H. WILD.

R.F. BRETHERTON displayed charts showing fluctuations in numbers and species of moths counted nightly in a light trap at Bramley, Surrey, in August and September 1981, in relation to atmospheric conditions. Numbers ranged in August from 890 moths of 116 species (Macros and Pyrales only) on the night of 6th/7th to 17 of 10 species on 16th/17th, and in September from 325 of 40 species on 7th/8th to 4 of 4 species on 13th/14th.

MICROLEPIDOPTERA

AGASSIZ, Rev. D.J.L.—(1) *Coleophora frischella* L., Grays, new to Essex. (2) Ireland: *Agonopterix pallorella* (Zell.), Burren, Co. Clare. *Epinotia mercuriana* Fröl., Co. Kerry. *Monopis imella* (Hübner.), Co. Cork and Burren, Co. Clare (New to Ireland).

ALLEN, Dr. A.A.—*Adela cuprella* (D. & S.), Brownsea Island, Dorset, 23.v. 1981.

BLAND, Dr. K.P.—Some Scottish Micros. *Johanssonia acetosae* Staint., reared from mines in *Rumex acetosa* collected at Aucheninnes Moss, Dalbeattie, Dumfries-shire (NX/8460; Vc. 72) on 13.vi.1981, imago emerged 28.vi.1981 (first Scottish record, and according to Emmet in Heath (1976), previously unknown north of Nottinghamshire). *Coleophora argentula* (Steph.), cases on

dead flowerheads of *Achillea millefolium* L., Yellowcraigs, East Lothian (NT/5285; Vc. 82), 27.ix.1981 (first Scottish record). *Phalonidia minimana* (Caradja), Blackpool Moss, Whitlaw Mosses, Selkirkshire (NT/5129; Vc. 79), 3.vii.1981 (second Scottish locality, previously only from Port Appin, Argyllshire). *Aphelia unitana* (Hübner), Blackpool Moss, Whitlaw Mosses, Selkirkshire (NT/5129; Vc. 79), 3.vii.1981 (second Scottish locality, previously only from Teviothead, Roxburghshire). *Adela croesella* (Scop.), Caerlaverock, Dumfriesshire (NY/0066; Vc.72), taken among brambles, 13.vi.1981 (third Scottish locality). *Micropterix thunbergella* (F.), Milton of Drimmie Wood, near Blairgowrie, Perthshire (NO/1651; Vc.89), at light on 18/19.v.1981 (most northern record). *Choreutis sehestediana* (F.) (*punctosa* (Haw.)), Gorton Bay, Isle of Coll (NM/1753; Vc.103), reared from *Scutellaria minor* L. (New foodplant), 24.vii.1981, imago emerged 4.vii.1981 (most northern record). *Capperia britanniodyctyla* (Gregson), Blackford Hill, Edinburgh (NT/2570; Vc.83), fairly strong colony on *Teucrium scorodonia* L., larvae collected 24.v.1981, imagines emerged 14.vi.1981 (confirmed as breeding in Scotland). *Coleophora sylvaticella* Wood, cases or imago exhibited from Colpy, Aberdeenshire (NJ/6334; Vc.93); Crichton, Midlothian (NT/3961; Vc.83); Hartside, Berwickshire (NT/4753; Vc.81); Craighall Wood, Perthshire (NO/1748; Vc.89). *C. violacea* Stroem (*hornigi* Toll), cases exhibited from: Methven Wood, Perthshire (NN/0526; Vc.88), ex alder on 18.x.1980 (reared); Cappercleuch, Peebleshire (NT/2423; Vc.78), ex hazel on 13.ix.1981; Endrick Mouth, Dunbartonshire (NS/4287; Vc.99), ex alder on 4.x.1981. (The records for both this and the previous species show them to be more widespread than previously thought).

Distribution maps of the British *Adela* species (i.e. *croesella*, *cuprella*, *fibulella*, *reaumurella*, *rufimitrella*) compiled from various literature and museum sources to promote a mapping scheme for the Incurvariidae & Heliozelidae to start early in the new year.

Exhibited on behalf of K. RANSOME. The first confirmed Scottish record of *Eucosma obumbratana* (Lienig & Zell.), one of two specimens taken 1 & 2. viii.1980 on the grassy banks of a disused railway, East Duddingston, Edinburgh (NT/3172; Vc.83) by K. RANSOME, D. HENDRY, M. TAIT & A. DUFFY. (Previously only one old unconfirmed record for Paisley, Renfrewshire (Bradley, Tremewan & Smith, *British Tortricoid Moths* 1979)).

BRADLEY, Dr. J.D.—Microlepidoptera from Buckingham Palace garden including: *Tinea pellionella* (L.), *Morophaga choragella* (D. & S.), *Caloptilia robustella* (Zell.), *Chalybites phasianipennella* (Hübner), *Phyllocnistis unipunctella* (Steph.), *Coleophora artemisicolella* Bruand, *C. laricella* (Hübner), *C. trifolii* (Curt.), *C. spissicornis* (Haw.), *C. lineolea* (Haw.), *C. tamesis* Waters, *C. versurella* Zell., *C. clypeiferella* Hofmann, *Blastodacna atra* (Haw.), *Blastobasis decolorella* (Woll.), *Agonopterix alstroemeriana* (Clerck), *Depressaria daucella* (D. & S.), *Scrobipalpa ocellatella* (Boyd), *Aroga velocella* (Zell.), *Bryotropha domestica* (Haw.), *Teleiodes alburnella* (Zell.), *Isophrictis striatella* (D. & S.), *Lozotaeniodes formosanus* (Geyer), *Lobesia abscisana* (Doubl.), *Evergestis extimalis* (Scop.), *Ancylosis oblitella* (Zell.).

BRETHERTON, R.F.—Species of the genus *Dioryctria* (Lep: Phycitinae): ?*D. abietella* D. & S., large form, possibly immigrant, with Continental examples of *D. sylvestrella* Ratz. for comparison; *D. abietella*, from Surrey and Invernessshire; ?*D. mutata* Fuchs, from Dorset and Surrey; five specimens from Surrey similar in appearance to a *Dioryctria* figured in Huismann, *Ent. Ber., Amst.*, 36:98 (1976) as *D. simplicella* Heinemann and new to the Netherlands.

CHALMERS-HUNT, J.M.—*Dioryctria schuetzeella* Fuchs, two examples of this Pyralid which is new to Britain, and first taken by the exhibitor at Orlestone, Kent on 23.vii.80, and again there in 1981. Specimens of *D. abietella* (D. & S.) and *D. mutata* Fuchs were shown for comparison.

EMMET, A.M.—(1) Microlepidoptera taken or reared in 1981. *Ectoedemia agrimoniae* (Frey) Five reared vii.1981 from *Agrimonia* in Newland Grove Nature Reserve, N. Essex (Vc.19). This is the most northerly locality for this species. *Stigmella auritella* (Skåla) Eight reared from *Salix aurita* in Bricket Wood, Herts., collected 2.xi.1980 at our field meeting. New to the county and the first specimens to be recorded in S.E. England. *Stigmella samiatella* (Zell.) Nine reared from leaves of *Quercus* at Hockley, S. Essex (Vc.18) and Great Holland, N. Essex (Vc.19). Only four other British specimens are known. It now seems to be established in the extreme east of Essex. *Ochsenheimeria mediopectinellus* (Haworth) One reared 6.vii.1981 from a larva found on grass at Grays Chalk Pit, S. Essex. *Caloptilia semifascia* (Haworth) Eight reared from Bedford Purlieus, Northamptonshire (Vc.32). In every specimen the usual white "semi-fascia" is obsolescent or completely obsolete. *Phyllonorycter anderidae* (Fletcher) Reared iv.1981 from *Betula* taken at the BE&NHS field meeting at Bricket Wood. New to the county. *Choreutis sehestediana* (F.) (*punctosa* (Haw.)) Eight from Pheasant House Wood Nature Reserve, S. Essex. The first Essex specimens since 1900 and the foodplant, *Scutellaria minor*, appears to be hitherto unrecorded. *Ypsolopha lucella* (F.) Eight from Barton Mills, W. Suffolk (Vc.26) on 14.vii. The series includes a male, which is rare. *Coleophora prunifoliae* Doets from larvae collected autumn 1980 at Benfleet, S. Essex (Vc.18) and Newland Grove Nature Reserve and Fingringhoe Wick Nature Reserve, both N. Essex (Vc.19). This newly recognised species is widespread in Essex except for the north-west. *Coleophora adjectella* Herrich-Schäffer reared from larvae on *Prunus* from Benfleet. This species, also newly recognised, is fairly common in southern and central Essex. *Pseudatemelia flavifrontella* (D. & S.) A specimen taken on 7.vi. at Redlynch, S. Wiltshire (Vc.8). New VC record. *Eulamprotes wilkella* (L.) Four taken at Bradwell-on-Sea, S. Essex on 10.vii., the first to be recorded in the county in the present century. *Monochroa lucidella* (Steph.) Four taken at Great Holland Pits Nature Reserve, N. Essex (Vc.19). Very locally abundant in Essex. *Chionodes fumatella* (Douglas) Two taken at Barton Mills, Suffolk on 18.viii.1981. Mainly coastal, but it also occurs in sandy areas. *Isotrias rectifasciana* (Haw.) Seven from the edge of a saltmarsh on Foulness Island, S. Essex on 22.vi. The moths were abundant settling on *Beta vulgaris* subsp. *maritima* and *Inula crithmoides* and possibly their larvae had fed on the decaying leaves of these plants. *Dichrorampha sedatana* Busck Seven taken flying round *Tanacetum* at Bulmer, N. Essex on 24.v. At this time the plants are still small and inconspicuous and consequently the species tends to be overlooked. (2) Distribution maps of the Lyonetiidae, Gracillariinae and Phyllocnistidae prepared for *The Moths and Butterflies of Great Britain and Ireland*, Volume 2.

FAIRCLOUGH, A.J. & R.—Microlepidoptera bred or caught in 1981. (1) *Micropterix mansuetella* Zell., Kennet Valley, Berks., 12.v. (2) From Norfolk: *Diplodoma herminata* (Geoff.), Holkham Meols; *Biselachista scirpi* (Staint.), Brancaster; *Bactra robustana* (Christoph), Brancaster; *Nascia ciliaris* (Hübner), Foulden; *Oncocera formosa* (Haw.), W. Rudham; *Monochroa tetragonella* (Staint.), Holm; *Brachmia inornatella* (Douglas), Foulden; *Glyphipterix schoenicolella* Boyd, Foulden, bred. (3) From Surrey: *Infurcitinea argenticumaculella* (Staint.), Reigate, bred; *Phyllocnistis saligna* (Zell.), Winkworth, bred. (4) Bred Coleophoridae including *C. machinella* Bradley from *Artemisia maritima*, Sheppey, Kent and the first Surrey specimens from *Achillea ptarmica*, Ashted.

FENN, J.L.—*Melissoblastes zelleri* (Joannis), Southwold, Suffolk; *Platytes alpinella* (Hübner), Weeting, Norfolk, at m.v.; *Dioryctria schuetzeella* Fuchs, Kent, at m.v., with *D. abietella* (D. & S.), Breckland, for comparison.

HALL, N.M.—A case of microlepidoptera, 1981 — being an exhibit from a beginner's viewpoint.

HARPER, Dr. M.W.—From Herefordshire, 1981. *Coleophora alnifoliae* Barasch, *C. limosipennella* Dup., *C. milvipennis* Z., *Stigmella aceris* Frey, Ledbury, May, *Swammerdamia compunctella* H.-S., June.

HEAL, N.F.—The following all from Kent, captured or bred in 1981 unless otherwise stated. *Ypsolopha mucronella* (Scop.), Sittingbourne, larvae 7.vii, bred 18/26.viii. *Adela croesella* (Scop.), Burham, 7.vi. *Coleophora machinella* Bradley, Sheppey, larvae on *Artemisia maritima* 23.vi, bred 5/8.viii. *C. salicorniae* Wocke, Higham, 7.viii.1980 (1); Sandwich Bay, 5.viii (1); both at m.v. *C. clypeiferella* Hofmann, Sandwich, 28.vii (1), at m.v. *Ancyliis laetana* F., Hothfield Bog, 8.viii (2), at m.v., indicating an occasional second brood. *Epichnopteryx retiella* (Newman), Leysdown, 26.v; Nagden, 30.v. *Coleophora binderella* Koll., Bonnington, bred 9.vii. from larva 21.v found feeding on and reared on hornbeam, a new larval foodplant. *C. paripennella* Zell., Whitstable, bred 14.vii from larva 9.vi found feeding on and reared on *Cirsium arvense*, a new larval foodplant. *Incurvaria pectinea* Haw., Whitstable, series bred 14/19.iii from larvae 20.v.1980 mining leaf of hazel and birch. *Lampronia flavimitrella* (Hübner), female, Hoads Wood, Bethersden, 21.v., the third record for Britain. *Mompha nodicolella* Fuchs, Thornden Wood, bred 18.viii from galls collected 14.vi on BENHS Field Meeting. *Cydia orobana* (Treits.), St. Margaret's Bay, 8.vii. *Olethreutes lacunana* (D. & S.), Kenardington, 11.vii, melanic example at m.v. *Yponomeuta irrorella* (Hübner), Wouldham, bred 9.vii from larva 27.v. *Cnephasia incertana* (Treits.), Queendown Warren, 27.vi, ab. with non-matching wing patterns.

HECKFORD, R.J.—*Caloptilia azaleella* (Brants), Plympton, Devon, series bred from *Azalea* sp. from neighbour's garden, 25.v.81. *Phyllonorycter scopariella* (Zell.), Plympton, Devon, series bred 13/21.v.1981 from *Sarothamnus*. Not previously recorded from Devon. *Ethmia dodeceea* (Haw.), Plymstock, Plymouth, 7.vii.1981. *Syncopacma larseniella* (Gozmány), Saltash, Cornwall, 11.vii.1971 at m.v.l.; Shapwick, Somerset, bred 10.vii.1979 from *Lotus uliginosus*; Plympton, Plymouth, bred 19/22.vii.1979 from *Lotus uliginosus*. All previously misidentified as *S. cinctella* Clerck. *Mompha lacteella* (Steph.), Luton, Devon, 5.vi.1976. *M. propinquella* (Staint.), Plympton, Devon bred 9/14.vi.1981 from *Epilobium tetragonum*, for comparison with *lacteella*. *Cochylis hybridella* (Hübner), Exmouth, Devon, 25.vii.1981. Not previously recorded from Devon. *Eucosma triplicana* (Barrett), Budleigh Salterton, Devon, 25.vii.1981. Not previously recorded from Devon. *Endothenia marginana* Haw., Saltram, Plymouth, series bred 25.iv.1981 from *Dipsacus fullonum*. *Agdistis staticis* Mill., North Cornish Coast, 7.ix.1981.

KNILL-JONES, S.A.—Microlepidoptera taken in London, SW5, *Nemopogon granaella* (L.), 9.vii.1980. *Tinea pallescentella* Staint., series v-viii.1980. *Dasycera sulphurella* F., 25.v.1980. *Blastobasis decolorella* Woll., 6.vii.1980. *Cacoecimorpha pronubana* (Hübner), 21.ix.1979. *Clepsis consimilana* (Hübner), 17.ix.1979. *Agriphila tristella* (D. & S.), 2.viii.1980. *Plodia interpunctella* (Hübner), 19.vi.1981. *Ostrinia nubilalis* (Hübner), 6.viii.1981. *Mirificarma mulinella* (Zell.), 8.viii.1981.

LANGMAID, Dr. J.R.—Four *Adela croesella* (Scop.), Icklingham, Suffolk, 2.vi.1981. *Calybites pyrenaeella* (Chrétien), St. Helens, I. of Wight, four bred from *Acer campestre*, vi.1981. *Phyllonorycter viminetorum* (Staint.), Leckford, Hants, one bred from *Salix viminalis*. *Argyresthia ivella* (Haw.), Sparsholt, Hants, four bred from *Malus sylvestris*. *Ypsolopha mucronella* (Scop.), ab. strikingly black-streaked, Sparsholt, Hants, bred from *Euonymus europaeus*. *Coleophora machinella* Bradley, Isle of Sheppey, Kent, four bred from *Artemisia maritima*; Wickham, Hants, bred from *Achillea ptarmica* for comparison. *Schiffermuelleria tinctella* (Hübner), Redlynch, Wilts, 11.vi.1981. *Enicostoma lobella* (D. & S.), Chilbolton Down, Hants, four bred from *Prunus spinosa*. *Metzneria aprilella* H.-S., Chilbolton and Portsdown Hill, Hants, bred from seedheads of *Centaurea scabiosa*. *Monochroa suffusella* (Douglas), Matley Bog, Hants, 8.vi.1981. *Eulamprotes wilkella* (L.), Southsea, Hants, 29.vii.1981; new to Hampshire. *Caryocolum vicinella* (Douglas), Southsea, four bred from *Silene maritima*; new

to Hampshire. *Mompha propinquella* Staint., Eastnor, Herefordshire, four bred from *Epilobium montanum*. *Blastodacna atra* (Haw.), Southsea, Hants, two, viii.1981. *Phalonidia luridana* (Gregson), Winchester, four 25.vii.1981. *Clavigesta sylvestrana* (Curtis), Southsea, Hants, two viii.1981. *Agdistis staticis* Milliére, Tintagel, Cornwall, two bred from *Limonium binervosum*. *Pterophorus spilo-dactylus* Curtis, Freshwater, I. of Wight, two bred from *Marrubium vulgare*.

MICHAELIS, H.N.—*Bucculatrix* sp., from Anglesey with mine and cocoon bred from *Myrica* and alleged to be *B. cidarella* Zell. on an alternative food to *Alnus*; flies at sunset in vi and early vii, and rests on top leaves of *Myrica* from 6-9 pm. *Agonopterix astrantiae* (Hein.), near Llandudno, one bred from *Sanicula* in late vii, one netted in viii; not recorded from north Wales for 30 years. *Agonopterix bipunctosa* (Curtis), Anglesey, two specimens ix.1980, one larva on *Serratula* vi.1981; not previously recorded from north Wales. *Caloptilia rufipennella* (Hübner), Glan Conwy, cones and pupae local and scarce viii.1980, moths emerged ix-x.1981; no previous records from north Wales.

PITKIN, Mrs. L.M.—*Metzneria aprilella* (H.-S.), reared from larvae in *Centaurea scabiosa* collected in Wiltshire xi.1980, emerged 4/22.vi.1981. *M. metzneriella* (Staint.), reared from larvae in *C. nigra* collected at same time and locality as *aprilella*.

SIMPSON, Dr. A.N.B.—*Psychoides verhuella* Bruand, Worcs., iii.1981. *P. filicivora* (Meyrick), Cards., vii.1981. *Monopis fenestratella* (Heyd.), Warks., vii.1980. *Depressaria pulcherrimella* Staint., Cards., v.81. *D. pimpinellae* Zell., Worcs., viii.1981. *Agonopterix propinquella* (Treits.), Worcester, vii.1981. *A. bipunctosa* (Curtis), Cards., v.81. *A. yeatiana* (F.), Pembroke, vii.81. *A. pulverella* (Hübner), Worcs., v.81. *Coleophora alnifoliae* Barasch, Worcs., ix.80. *C. sylvaticella* Wood, Worcs., viii.79. *Calybites phasianipennella* (Hübner), Worcs., viii.1981. *Cydia pallifrontana* (Lienig and Zell.), Worcs., vi.1981. *Chionodes fumatella* (Douglas), Worcs., vii.1981. *Mompha propinquella* Staint., Worcs., ii.1981.

SOKOLOFF, P.A.—Honeycomb infested with *Achroia grisella* (F.), Orpington, Kent, together with specimens of the imago, and examples of another comb pest *Galleria mellonella* (L.) Species bred from larvae collected at the Benfleet field meeting in 1980, including *Coleophora prunifoliae* Doets (sloe), *C. adjectella* H.-S. (sloe), *C. anatipennella* (Hübner) (sloe), *C. artemisicolella* Bruand (*Artemisia vulgaris*), *C. atriplicis* Meyrick (*Suaeda maritima*), *C. salinella* Staint. (*Atriplex littoralis*), *Eucosma tripoliana* (Barrett) (*Aster tripolium*). Species bred from larvae collected in Blean Woods including *Epinotia solandriana* f. *trapezana* (from *Rosa*, an unusual foodplant), *Syncopaema* (?) *larseniella* Gozmány (*Lotus*). Imagines taken at the same meeting including *Anania funebris* Stroem, *Pseudotelphusa scalella* (Scop.), *Teleiodes paripunctella* (Thunb.), *Ancylis obtusana* (Haw.) and *Gelechia rhombella* (D. & S.) *Sitochroa palealis* (D. & S.), Stone, Kent.

STERLING, M.J.—*Ancylis myrtillana* Treits., a melanic specimen, bred from pods collected on Beeley Moor, Derbyshire, iv.1981. *Cedestis gysseleniella* Z., University Park, Nottingham, m.v. light 27.vii.1981. *Eidophasia messingiella* (F.v.R.), Attenborough, Notts., at light 7.vii.1981. *Eucosma pupillana* (Clerck), Long Eaton, Derbyshire 21/28.vii.1981. *Phalonidia alimana* (Rag.), Attenborough, Notts., at light 13.vi.1981. *Euzophera cinerosella* Z., Long Eaton, Derbyshire, 28.vii.1981 at light.

STERLING, Col. D.H.—Species taken or bred in 1981. *Meesia richardsoni* Wals., Portland, Dorset, empty larval cases found on lichens under rocks; six cases containing live larvae were also taken. *Caloptilia cuculipennella* (Hübner), Portland, Dorset, moths found under rocks whilst searching for *M. richardsoni* larvae; presumably their hibernation site. *C. semifascia* (Haw.), Crab Wood, Winchester (Vc.11), bred from *Acer campestre*. *Coleophora inulae* Wocke, Botley Wood, Hants., bred from *Pulicaria dysenterica*. *Esperia oliviella* (L.), Harewood Forest, Hants (Vc.12), bred from a larva found by P.H. Sterling

in rotting oak; a new vice-county record. *Enicostoma lobella* (D. & S.), Chilbolton Down, Hants, bred from larvae on *Prunus spinosa*. *Metzneria aprilis* (H.-S.), near Stockbridge, Hants (Vc.12), bred from *Centaurea scabiosa* from roadside. *Stathmopoda pedella* (L.), Leckford, Hants (Vc.12), one beaten from *Alnus glutinosa*; apparently only the third Hants record since 1897. *Pammene populana* (F.), Chichester gravel pits, W. Sussex, bred from *Salix viminalis* shoots collected in February. *Olethreutes olivana* (Treits.), Winchester, Hants (Vc.11), taken in garden m.v.trap; the first confirmed county record. *Phalonidia luridana* Gregson, Teg Down, Winchester (Vc.11), where it is quite common. *Leioptilus lienigianus* (Zell.) Leckford, Hants (Vc.12), bred from larvae taken from *Artemisia vulgaris*; first record of its breeding in Hampshire.

TWEEDIE, M.W.F.—The British *Dioryctria*, including the recently discovered *D. schuetzeella* Fuchs: specimens and photographs.

WILD, E.H.—*Acleris cristana* D. & S., Highcliffe, 10.ix.81. *Buckleria paludum* Z., New Forest, 12.viii.1981. *Amblyptilia punctidactyla* Haw., New Forest, resting among Wood Sage, 5.ix.1981.

FOREIGN MICROLEPIDOPTERA

P.H. STERLING—Specimens of smaller Lepidoptera, still in field collecting tins, collected or bred during the Oxford ecological expedition to Aldabra, July to October 1981. Aldabra is a raised coral atoll in the Indian Ocean about 400 km north west of Madagascar. The smaller Lepidoptera have not previously been collected or studied to any extent. When they have all been identified, it is estimated that about 150 species of Lepidoptera will have been found.

FOREIGN MACROLEPIDOPTERA

There were more than twenty exhibits of foreign macrolepidoptera, which added much colour to the Exhibition and indicated a wide variety of members' interests.

From the Palaearctic zone STIG TORSTENIUS and C.B. ASHBY showed seven drawers of Scandinavian Rhopalocera containing 106 species, from the collection which the former has presented to the Society. These were especially interesting as showing "British" species as part of a wider lepidopterous fauna, as well as a number of others the present range of which stops short of Britain but includes countries bordering the British seas. There were accompanying explanatory maps, and also useful slips for members to take away which gave references for further detail on the area.

P.W. CRIBB, R. DYSON and R.F. BRETHERTON showed selections from 116 species of butterflies, and also some Zygaenidae, seen on a joint expedition to the Swiss Valais, north west Italy, and the French Jura, with others *en route*, in late July 1981. Owing to bad weather several additional species of the genus *Erebia* could only be illustrated by specimens caught in earlier years. C.J. LUCKENS also showed species from the Valais and Jura caught in June 1981.

G.N. BURTON showed butterflies taken in the Cevennes in April and August 1981, with particular emphasis on Satyridae and Hesperidae. These included dwarf specimens of *Iphiclides podalirius* (L.), *Anthocharis belia* (L.), *Pseudophilotes baton* (Bgstr.) and *Callophrys rubi* (L.); also a few moths, of which *Aleucanitis cailino* (Lefebvre) is of interest because it is mainly a species from the Mediterranean littoral and further east. N.M. HALL also showed moths from western France and gave a comparison between *Cyclophora punctaria* (L.) and *C. quercimontana* Bastelberger: the latter species has not been detected in Britain, but should be watched for.

G.N. and J. MANSELL exhibited *Erebia* species from the French Pyrenees taken in 1980 and 1981, showing the differences between *E. hispania goya* Frhst., *E. hispania rondoui* Obth., and *E. cassioides* Hochwt., with which they are sympatric. He also showed the very distinct adults of *E. lefebvrei pyrenaica* Obth. and *E. lefebvrei astur* and remarked on differences between their ova and larvae, and adults of *E. gorgone* Bdv. found on similar ground. Also shown were both sexes of *E. epistygne* (Hübner) from Provence, females having been seen to lay, and first instar larvae later found, on the grass *Festuca indigesta*; larvae now reared to their fifth instar in England were feeding readily on the more humanly palatable *F. ovina* (Sheep's Fescue).

From various localities in north and central Spain H.G. PHELPS had a selection of butterflies taken 6 to 30 July 1981, which included *Maculinea arion* (L.) ab. *marginata* Le Chamb., *M. alcon* (D. & S.) ab. *radiata* Courv., and *Lysandra caerulea* (Tutt) ab. nov. From Mazaron in south Spain H. EDMUNDS showed a small series of *Zygaenidae* and various other *Lepidoptera*. R.J. JAMES showed typical male and female specimens of *Pieris cheiranthi* Hübner from the Canary Islands and *P. brassicae* (L.) ab. *coerulea* Gardiner, together with specimens bred for three generations this year from an original pairing of the two species. These show a complete gradation. He also had two female specimens of *Pieris rapae* (L.), caught by N.C.D. Jones in a hotel garden in Funchal in September 1981. These are believed to be the first confirmed specimens from Madeira.

On behalf of JOHN G. COUTSIS, R.F. Bretherton showed mounted photographs of the upper and undersides of both sexes of a *Pseudochazara* species (*Satyridae*) believed to be new to Greece and Europe, and possibly to science, found in a forest of black pine (*Pinus nigra*) in north Greece in 1981. W.G. TREMEWAN exhibited species and sub-species of *Zygaenidae* from eastern Turkey: *Z. olivieri ganymedes* H-S., *Z. carniolica iberica* Kolenati (including a male showing homoeosis), *Z. loti georgiae* Reiss, *Z. armena* Eversmann, *Z. dorycnii korbiana* Reiss, *Z. tamara zuleiga* Naumann & Naumann, *Z. tamara mahabadica* Reiss and *Z. tamara placida* Bang-Haas.

J. McFEELY had some striking results from selective breeding for variation of *Apatura iris* (L.) and, for comparison, of *A. ilia substitutus* Butler from Japan, and Dr. C.J. LUCKENS showed butterflies collected in New England, U.S.A. selected for their affinities with Palaearctic species. R. T. LOWE displayed photographs of two American moths as additions to the British list: *Pseudoplusia includens* (Walker), larva and imago, found in *Asparagus plumosa* imported from Florida, and *Copitarsia consueta* (Walker), larva and male and female moths, found in carnation flower heads from Bogota, Colombia. K.G.W. EVANS showed a specimen of *Antichleris eriphia* (F.) (*Ctenuchidac*) found at Addiscombe, Surrey on January 21, 1981, having emerged from bananas from Ecuador — the first British record.

Tropical species without tenuous British connections were represented by a fine collection of 93 species of butterflies from Sri Lanka, July 6 to 26, 1981, by G.H.H. BROOME. Of these two species and fifteen races are endemic to that island. T.J.G. HOMER showed three drawers of butterflies and one of moths from South Africa taken in the African summer from December to March 1980/1, one drawer being devoted to *Meneris tulbaghia* (L.), which was localised, with the brilliant red-flowered *Suurkanol chathmanthe aethiopica*, high on the Helderberg range. Moths caught at fluorescent lights in Transkei included *Lophostethus dumolini* (Lat.) and two *Daphnis nerii* (L.). N.E. TURNER had a collection of *Pieridae* made over a number of years on visits to Australia, the Far East, South Africa and South America. It contained many seasonal forms of *Colotis* species from South Africa; of the variable *Catopsilia pomona pomona* (F.) from Australia, Malaysia and Singapore; and of sub-species and a gynandromorph of *Belenois creona severia* (Stoll). T. FOX showed photographs of over twenty butterfly species from tropical Mexico, taken in September and October 1980.

ODONATA

VICK, G.S.—The European Aeshnidae, with examples of 15 of the 17 species occurring in Europe, including the 8 British species. Attention was drawn to four species of interest: *Boyeria irene* (Fonsc.), breeding in rivers of S.W. Europe, flying at dusk. Females occur in two forms, distinguished by form of anal appendages — the rarer long-tailed form exhibited from France, Lot, Corn.-Brengues, River Célé, 28.vii.4.viii.81 and Hérault, Soutayrol, River Vis, 28.vii.79, with larval skin, short-tailed form also from latter locality; male from Hérault, Causse de la Seile, River Hérault, 25.vii.79; *Aeshna* ^{serrata} *serrata* Hagen, a large blue species breeding in brackish marshes in and around the Baltic Sea, from Sweden, Östergötland, Furingstad, 29.vii.80; *A. viridis* Evers., larvae developing in *Stratiotes aloides* in fens in northern Europe from Sweden, Skåne, Ugglarpe Massen, 24.vii.80; *A. subarctica* Walker, a species of Alps and northern Europe closely related to *A. juncea* (L.) breeding in *Sphagnum* bogs, 3 examples from Sweden and Finland.

DIPTERA

CHANDLER, P.J.—Some French and Spanish Diptera collected in 1980. (a) examples of two families not represented in Britain: *Fallenia fasciata* (F.) (Nemestrinidae) France, Lot, St. Martin-en-Vers and Labastide-Murat, both in flowery meadows, 24.vi.; *Blepharocera fasciata* (Westwood) (Blepharoceridae), Spain, Santander, Desfilado de la Hermida, 17.vi., riverside wood. (b) non-British species in other families: *Volucella elegans* Loew (Syrphidae), Spain, Burgos, near Oña, 19.vi., at *Cornus* flowers in pine forest; *Dasyrhamphus ater* (Rossi) (Tabanidae), Spain, Navarra, north of Aibar, 21.vi., coming to bite in open pine forest; *Dioctria flavipennis* Mg. (Asilidae), Spain, Palencia, Aguilar de Campoo, 19.vi., both sexes from a grassy track in pine scrub; *Dasypogon teutonius* Macq. (Asilidae), France, Lot, Rocamadour, 24.vi., meadow by stream; *Eriopogon laniger* (Mg.) (Asilidae), Spain, Huesca, south of Biescas, 24.vi., dry scrub; *Usia atrata* Fabricius (Bombyliidae), Spain, Palencia, Aguilar de Campoo, 19.vi., with *Dioctria flavipennis*; *U. aurata* F. (Bombyliidae), 19.vi., with *U. atrata*, settled on bare ground; *Conophorus griseus* (F.) (Bombyliidae), Spain, Navarra, near Lerga, open streambank, 21.vi., frequent at *Matricaria* flowers.

HALSTEAD, A.J.—Some less common Conopidae and Syrphidae collected mainly in Surrey in 1979-1981. Conopidae: *Conops quadrifasciata* Deg., Surrey, Basingstoke Canal, 1.ix.79, in copula on *Mentha aquatica* flowers; *C. flavipes* L., Surrey, Basingstoke Canal and R.H.S. Garden, Wisley; *C. vesicularis* L., Surrey, R.H.S. Garden, 16.v.80, ♀ netted on bank of River Wey; *Leopoldius signatus* (Wied.), Surrey, Wisley, R.H.S. Garden, 3.x.80, ♀; Herts, Royston, 26.ix.81, ♂, both at *Hedera* flowers; *Physocephala rufipes* (F.), Surrey, Wisley Common, 21.viii.79; *Myopa buccata* (L.), Surrey, West Byfleet, Basingstoke Canal, 14.vi.80, ♀ on flower of *Aegopodium*; Wisley, R.H.S. Garden, 10.vi.81, ♂ on flower of *Stranvaesia*; Syrphidae: *Didea fasciata* Macq., Surrey, R.H.S. Garden, Wisley, 23.ix.81, ♀ at *Hebe* flower; 28.ix.81, ♂ at *Hedera* flower; *Brachyopa insensilis* Collin, Surrey, Woking, Basingstoke Canal, 13.vi.81, ♂ hovering in front of a sap run on beech trunk; *Volucella inanis* (L.), Surrey, Wisley, R.H.S. Garden, 12.viii.80, ♀ on bramble foliage; 13.viii.80, ♂ at *Eupatorium* flowers; *V. inflata* (F.), Surrey, near Dorking, 29.vi.80, ♀ at *Heracleum* flowers by river Mole; *Xylota xanthocnema* Collin, Surrey, Wisley, R.H.S. Garden, 22.vi.81, ♂ on nettle foliage by river Wey; *Brachypalpoides lenta* (Mg.), Surrey, Wisley, R.H.S. Garden, 4.vi.80, ♂ in nylon mesh horticultural tunnel; *Helophilus hybridus* Loew, Surrey, Woking, Horsell Common, 7.x.79, ♀ on flower of *Senecio squalidus*; *Parhelophilus frutetorum* (F.), London S.W.3, Chelsea Physic Garden, 21.v.80 ♂; *P. versicolor* (F.), Hants, Odiham Common, 20.vi.81, ♂ ♀ at flowers of *Oenanthë*.

McLEAN, I.F.G. — Four species found during surveys by N.C.C. and Diptera Recording Schemes in 1981. *Atylotus rusticus* (L.) (Tabanidae), Sussex, Manxan Level, 16.vii.81, found during N.C.C. Survey of Pevensey Levels, only one other record from Britain this century; *A. fulvus* (Mg.) (Tabanidae), Hants, Oberwater, 7.vii.81, found during N.C.C. Survey of New Forest valleys; *Lonchoptera nigrociliata* Duda (Lonchopteridae), Gwent, Maerdy, 19.x.81, beside river Monnow; *L. meijerei* Collin (Lonchopteridae), Gwent, Llangula, 19.x.81, by river Monnow (both latter found during Diptera Recording Schemes Meeting at Monmouth).

COLEOPTERA

McCLENAGHAN, I. — Coleoptera from Thorndon Country Park, Essex, TQ69, and nearby woods included: *Paromalus flavicornis* (Herbst) (Histeridae), *Siagonium quadricorne* Kirby (Staphylinidae), *Bibloporus minutus* Raffray (Staphylinidae), *Melasis buprestoides* (Linn) (Eucnemidae), *Thanasimus formicarius* (Linn) (Cleridae), *Pediacus dermestoides* (Fabricius) (Cucujidae), *Biphyllus lunatus* (Fabricius) (Biphyllidae), *Pseudotriphyllus suturalis* (Fabricius) (Mycetophagidae), *Triphyllus bicolor* (Fabricius) (Mycetophagidae), *Eledona agricola* (Herbst) (Tenebrionidae), *Tetratoma fungorum* Fabricius (Tetratomidae), *Dryocoetus villosus* (Fabricius) (Scolytidae), *Bitoma crenata* (Fabricius) (Colydiidae).

Pycnomerus fuliginosus Erichson, taken in 1981 from under bark outside the timberyard in Epping Forest where this Australasian species was first recorded in 1964. *Thymalus limbatus* (F.) (Peltidae), from Ullswater.

HODGE, P.J. — Five species new to Sussex: *Stenus butrintensis* Smetana (Staphylinidae), recently separated from the less rare *S. pallitarsis* Steph. *Liogluta oblongiuscula* (Sharp) (Staphylinidae), *Porcinolus murinus* (F.) (Byrrhidae) and *Rhynchites olivaceus* Gyll. (Attelabidae).

Also from Sussex, *Atomaria barani* Brisout (Cryptophagidae), with one previous county record and very few recent British records; a short series of the rare *Abdera quadrifasciata* (Curtis) (Melandryidae), taken running on oak fence posts in a West Sussex woodland.

A selection of Scottish Highland species included *Bembidion scheuppeli* Dejean (Carabidae), *Lathrobium dilutum* Erichson (Staphylinidae), *Brachygluta pandelli* (Saulcy) (Pselaphidae) and *Hydrosmeeta eximia* (Sharp), all having very restricted distributions.

A rare northern species, *Xylostiba monilicornis* (Gyll.) (Staphylinidae), was found under oak bark at Danebridge, Staffs., probably a new county record and near to its most southerly known record in Britain.

OWEN, Prof. J.A. — Some beetles from Scotland, *Atheta hansseni* Strand found in moss soaked with birch sap at Loch Tummel in May 1981 was apparently the first specimen of this beetle to be recognised in Britain, and *Cis dentatus* Mellié taken with other examples by the exhibitor and Mr. Ian Carter from under pine bark near Aviemore in August 1980, apparently only the second record for this species in Britain. Other species shown included: — *Nebria nivalis* (Payk.), Ben More, Mull, vii.1970. *Leistus montanus* Steph., S. Uist, vii.1978. *Bembidion virens* Gyll., Easter Ross, viii.1981. *Amara alpina* (Payk.), Cairngorms, viii.1981. *Bryoporus crassicornis* (Mäklin), Cairngorms, v.1981. *Bryoporus rugipennis* Pandellé, Cairngorms, vii.1978. *Ocyusa hibernica* (Rye), South Uist, vii.1979. *Atomaria sahlbergi* Sjöberg, Loch Garten, vii.1979. *Micrambe lindbergorum* (Bruce), Loch Garten, vii.1979. *Epuraea terminalis* (Mannerheim), Strathconon, ix.1981. *Rhopalodontus perforatus* (Gyll.), Loch Gary, Inverness, vii.1979. *Tomicus minor* (Hartig), Abernethy Forest, vii.1979.

SIDDON, P.N. — *Strangalia quadrifasciata* (L.), Breney Common, near Bodmin 22.vii.1978 and *Judolia cerambyciformis* (Schränk) also from near Bodmin 24.vi.78, both feeding on bramble flowers by day. *Prionus coriarius* (L.) and *Delaster dichrous* (Grav.) taken at m.v. light 7.viii.81 at Luxulyan, Cornwall.

PHOTOGRAPHS AND ILLUSTRATIONS

The number of members staging photographic exhibits continues to increase, and in general the quality remains exceptionally high. It is pleasing to note an increase in the amount of entomological "art work" presented at the exhibition.

D. APPLETON.—Colour prints of two aberrations of *Pararge aegeria* (L.) ab. *intermediana* Lempke from the Landslip, I.O.W. and a very dark form from Botley Wood, Hants.

R. DYKE.—Original painting of *Acleris cristana* D. & S. forms used to illustrate the 1981 Presidential address, and published in the Proceedings 14 pl. 3.

T. FOX.—Numerous colour prints of Mexican butterflies.

D. FURNELL.—Colour prints showing the life cycle of the Orange Tip, *Anthocharis cardamines* (L.); larvae of *Lycaena phlaeas* (L.) and *Hamearis lucina* (L.) and imagines of *lucina* and *Ladoga camilla* (L.).

R.T. LOWE.—Colour prints of various stages of two moths imported with plant material from America: *Pseudoplusia* sp. (asparagus) and *Copitarsia consueta* (carnation).

Rev. J. MARCON.—An example of the rare work by S.L. Mosley "Illustrations of British Lepidoptera Coloured by Hand".

S.J.L. MANSFIELD (JOYCE BEE).—Six entomological designs, mainly of British butterflies, for postcards published by the British Museum (Natural History).

R. REVELS.—A large display of natural history photographs in colour and monochrome, mainly depicting Lepidoptera and Odonata.

M. TWEEDIE.—Prints of *Euplocamus ophisa* Cramer from Northern Greece. Monochrome prints of the phycitid genus *Dioryctria* Zell. including the recently discovered *D. schuetzeella* together with *D. mutata* Fuchs and *abietella* D. & S.

The generic placing of *Phalaena* (*Bombyx*) *pudibunda* L. and *Phalaena* (*Bombyx*) *fascelina* L. (Lepidoptera: Lymantriidae)—A recent paper on Spanish and Canaries Lymantriidae (Bacallado *et al.*, 1981 SHILAP, Revta lepid., 9: 7-14) supported the placing of *pudibunda* L. in the genus *Elkneria* Börner as suggested by Ferguson (1978 Moths of America North of Mexico vol. 22.2, London) and of *fascelina* L. in the genus *Dicallomera* Butler, of which it is the type species. Both species are, in facies and male genitalia, very distinct from the North American type species of *Dasychira* Hübner, *tephra* Hübner. Indeed, the genus *Orgyia* Ochsenheimer is closer to typical *Dasychira* in morphology than are the two species under discussion, and so inclusion of the latter in *Dasychira* would, for consistency, require that *Orgyia* be sunk to *Dasychira*. So the separation of *fascelina* and *pudibunda* from *Dasychira* is justified.

There are numerous species in the Oriental Region and Australasia that have very similar male genitalia to *pudibunda* and I recently had cause to establish a generic name for the whole group (Holloway, in press, in Barlow, H.S., *An introduction to the moths of south east Asia*, Kuala Lumpur). There is an available generic name much older than *Elkneria*: *Calliteara* Butler. It is based on a Japanese species, *argentata* Butler, that is very close to *pudibunda*; the genus *Dicallomera* Butler was described in the same publication (Butler, Trans. ent. Soc. Lond. 1881: 1-23).

The species *fascelina* is morphologically distinguished from *Calliteara* species in the male genitalia principally in the possession of a well developed uncus; in *Calliteara* the uncus is absent. Its separation by Bacallado *et al.* in the genus *Dicallomera* appears justified.

The two species are therefore: *Calliteara pudibunda* L.; *Dicallomera fascelina* L.—J.D. Holloway, Commonwealth Institute of Entomology, 56 Queen's Gate, London, S.W.7.

BENHS Field Meeting: Odiham Common, N.E. Hants., 20.vi.1981. Leader: S.R. Miles.—The meadow and marsh fauna was explored in sunshine by three members, with numbers of *Adscita statice* (L.), the Forester moth, being seen on *Centaurea* sp. flowers. It was found profitable to examine the umbels of *Oenanthe* sp. typical of the marsh vegetation here. Many syrphid flies were seen on these flowers including numbers of the local species *Parhelophilus versicolor* (F.) and a few *Leucozona laternarius* (Müller).

A number of interesting spiders were also seen including the local araneid *Zilla diodia* (Walck.) which has a southern distribution in this country. It was interesting to see males of the spider *Pisaura mirabilis* (Clerck) sitting on the ground vegetation clutching their prey of insects wrapped up ready for presentation to the female as part of their courting procedure.

The early afternoon became overcast, insects were much less in evidence except, that is, for the biting flies which were ever-present in the darker and wetter parts of the woodland. It was pleasant to see many of the common species of orchid in the damper parts of the area, *Dactylorhiza praetermissa* (Druce) (Southern Marsh Orchid) being notable among these. Later, numbers of the common solitary wasp *Argogorytes mystaceus* (L.) (which preys on frog hopper (cercopid) nymphs, snatching them out from under their spittle covering) were seen visiting the flowers of *Vicia sepium* L. (Bush Vetch) and *Euphorbia amygdaloides* L. (Wood Spurge) in some of the woodland rides.

Other species recorded were:

DIPTERA: thirty-one Syrphidae including *Xanthogramma citrofasciatum* (Degeer), *Criorhina asilica* (Fallen), *C. berberina* (F.), *C. floccosa* (Meigen). HYMENOPTERA SYMPHYTA: *Tenthredopsis nassata* (L.), *Tenthredo colon* Klug, *T. atra* L., *T. celtica* Benson, *T. mesomelas* L., *T. schaefferi* Klug, *Dolerus niger* (L.), *Athalia lugens* (Klug), *Eutomostethus luteiventris* (Klug), *E. ephippium* (Panzer), *Blennocampa pusilla* (Klug), *Phymatocera aterrima* (Klug). ARACHNIDA: *Misumena vatia* (Clerck), *Pardosa prativaga* (L. Koch), *P. amentata* (Clerck), *Tetragnatha montana* Simon, *Araneus cornutus* Clerck, *A. cucurbitinus* Clerck.

BENHS Meeting 9.vii.81.—Exhibits. Mr. J.M. CHALMERS-HUNT: (1) An ingenious piece of old collecting equipment for taking moths off walls, invented by E.J. Bunnnett (1865-1949), and presented to the exhibitor by the late Stanley Wakely. It consists of an iron box with glass top attached to a wooden stick with an iron plate which is attached to another stick screwed to the first stick. When the two sticks are closed the plate slides over to close the box and so traps the moth inside. Wakely told him that Bunnnett used it to collect moths off lighted walls of his house at Hastings and found it quite effective. (2) *Eratophyes aleatrix* Diakonoff (Lep: Oecophoridae), a new species recently discovered in Holland, breeding in decaying wood from birch and willow branches. J.B. Wolschrijn (1981), *Ent. Rec.* 93: 111 recommends British lepidopterists to search for this species by collecting dead wood in the spring. The moth is black with white and pale yellow markings.

Communications. Mr. G. PRIOR confirmed hawthorn as a foodplant of *Eupithecia insigniata* (Hübner) by finding half-grown larvae on 9.vii.81. Mr. K. EVANS reported that over the last few days *Tortrix viridana* (L.) had reached plague proportions at his Addiscombe, Surrey, trap. Mr. R.F. BRETHERTON estimated some 10,000 *viridana* at his Bramley trap on 5/6.vii.81. He felt that the lack of frosts might be the reason for this population explosion. On 8.vii his trap had yielded 233 moths of 72 species. Mr. E.H. WILD reported 401 moths of 69 spp. at Selsdon, Surrey on 8.vii, whilst Mr. M. HADLEY reported 7-800 moths in 2 h in Cornwall on 7.vii, with 7-8 *Bomolocha crassalis* (F.).

Members showed a number of very fine colour slides of insects and spiders to round off the meeting.

BENHS Field Meeting: Ashted Common, Surrey, 25.x.1981. Leader: R. Fairclough. —Three Belgian visitors joined members from many parts of Britain for the post-exhibition meeting. The list of Lepidoptera below, though disappointing, says much for the skill and knowledge of those present in gathering this total in two wet hours. The meeting was abandoned after lunch as the rain became heavier. A few members went on to Box Hill to collect mines of *Parectopa ononidis* (Zell.).

Moths beaten out of thick cover: *Ypsolopha ustella* (Clerck), *Agonopterix arenella* (D. & S.), *A. ocellana* (F.) and *Epirrita dilutata* (D. & S.). *Emmelina monodactyla* (L.) moths and *Ancylys badiana* (D. & S.) larvae were found.

The list of species appended were observed or identified for others mainly by A.M. Emmet. Abbreviations:— A, adult; C, larval case; TM, tenanted mine; VM, vacated mine.

Ectoedemia intimella (Zell.) TM on *Salix*. *E. argentipedella* (Zell.) TM. *E. atricollis* (Staint.) VM on *Crataegus*. *E. albifasciella* (Hein.) VM on *Quercus*. *E. subbimaculella* (Haw.) TM on *Quercus*. *Stigmella aurella* (Fabr.) TM on *Rubus*. *S. plagicolella* (Staint.) TM on *Prunus*. *S. salicis* (Staint.) TM on *Salix*. *S. perpygmaeella* (Doubl.) TM on *Crataegus*. *S. atricapitella* (Haw.) TM on *Quercus*. *S. ruficapitella* (Haw.) TM on *Quercus*. *S. basiguttella* (Hein.) TM on *Quercus*. *S. anomalella* (Goeze) TM on *Rosa*. *S. malella* (Staint.) TM on *Malus*. *S. hybnerella* (Hübner) VM on *Crataegus*. *S. microtheriella* (Staint.) VM on *Corylus*. *Tisheria ekebladella* (Bjerk.) TM on *Quercus*. *T. marginea* (Haw.) TM on *Rubus*. *Heliozela sericiella* (Haw.) VM on *Quercus*. *Lyonetia clerkeella* (L.) A, TM, VM on *Malus*. *Bucculatrix frangulella* Zell. VM on *Frangula*. *B. ulmella* Zell. VM on *Quercus*. *Caloptilia stigmatella* (F.) VM and cones on *Salix*. *Parornix anglicella* (Staint.) VM and cones on *Crataegus*. *P. devoniella* (Staint.) TM and folds on *Corylus*. *P. finitimella* (Zell.) VM and folds on *Prunus*. *Callisto denticulella* (Thunb.) VM and folds on *Malus*. *Acrocercops brongniardella* (Fabr.) VM on *Quercus*. *Phyllonorycter heegeriella* (Zell.) VM on *Quercus*. *P. oxyacanthae* (Frey) TM on *Crataegus*. *P. blancardella* group TM on *Malus*. *P. pomonella* (Zell.) TM on *Prunus*. *P. corylifoliella* (Hübner) VM on *Crataegus*, *Malus*. *P. viminiella* (Sircom) TM on *Salix purpurea*. *P. salicicolella* group TM on *Salix*; some retained for determination by rearing. *P. coryli* (Nic.) TM on *Corylus*. *P. lautella* (Zell.) TM on *Quercus*. *P. nicellii* (Staint.) TM on *Corylus*. *P. sylvella* (Haw.) TM on *Acer campestre*. *Coleophora gryphipennella* (Hübner) C on *Rosa*. *C. striatipennella* (Tengst.) C. *C. viminetella* Zell. C on *Salix*. *C. potentilliae* Elisha, C on *Rubus*. *C. aedeaeppennella* Scott, C on *Quercus*. *C. discordella* Zell. C on *Lotus*.

Foodplants of *Pulvinaria regalis* Canard (Hem: Coccidae) in England. —Mrs. Eager, of Kew, Surrey, submitted a photograph and specimens of *P. regalis* feeding on Bay, *Laurus nobilis* L. This sap-feeding insect was first recorded in Britain in 1964 on Horse Chestnut (*Aesculus hippocastanum* L.) and it is sometimes called the Horse Chestnut Scale. It may have been accidentally introduced from Japan, as many of its host plants in this country have a Japanese origin. The scale has become widely established in S.E. England and its other host plants include London Plane (*Platanus* × *hispanicus*) Lime (*Tilia*), Elm (*Ulmus*), Sycamore (*Acer pseudoplatanus* L.), Japanese Maples (*Acer* spp.), *Magnolia* spp., *Skimmia japonica* and Holly (*Ilex aquifolium* L.). The young larvae overwinter and the species is univoltine. The females lay eggs in May-June amongst white, waxy fibres that protrude from under the edge of the scale. Heavy infestations can give the bark the appearance of having been hit by a mid-summer blizzard. The eggs hatch in June-July and the larvae feed at first on the leaves, but later move onto the bark of the trunk and larger branches. Little apparent damage is caused to the host tree by a heavy attack. —A.J. Halstead.

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The British Entomological and Natural History Society announces that awards may be made from this Fund for the promotion of entomological research with particular emphasis on:—

- Leaf-miners,
- Diptera, particularly Tephritidae and Agromyzidae,
- Lepidoptera, particularly Microlepidoptera,
- General entomology,

in the above order or preference having regard to the suitability of candidates and the plan of work proposed.

Awards may be made to assist travelling and other expenses necessary to field work, for the study of collections, for attendance at conferences, or, exceptionally, for the costs of publication of finished work. In total they are not likely to exceed £250 in 1982/1983.

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RECORDS OF MIGRANTS 1969-77

R.F. Bretherton, Folly Hill, Birtley Green, Bramley, Guildford, Surrey would welcome unpublished records of the scarcer migrant moths for a paper reviewing the years 1969-77.

Agassiz, D.J.L. <i>Oegoconia caradjai</i> Popescu-Gorj & Căpușe (Lep: Gelechiidae) recognised as British	1
Allen, Dr. A.A. Observations on the ectoparasitic stage of two <i>Homobbus</i> spp. (Hym: Braconidae)	11
Clayden, C.N. Conservation at work in the Ministry of Defence	12
Craik, J.C.A. Further remarks on the larvae of <i>Amphipyra pyramidea</i> (L.) and <i>A. berbera</i> Rungs	25
Falk, S.J. <i>Dolichovespula media</i> (Retzius) -- a new British social wasp	14
Feltwell, J. Studies on butterfly populations	17
Hadley, M. Status of the Foresters (<i>Procris</i> spp.)	10
Halstead, A.J. Foodplants of <i>Pulvinaria regalis</i> Canard (Hem: Coccidae) in England	46
Holloway, J.D. The generic placing of <i>Phalaena (Bombyx) pudibunda</i> L. and <i>Phalaena (Bombyx) fascelina</i> L. (Lep: Lymantriidae)	44
Newcombe, M.J. Pabula of <i>Helix pomatia</i> L., edible or Roman snail	28
Simson, E.C.L. Forcing development of Lepidoptera	26
Stubbs, A.E. Wildlife and Countryside Act, 1981	6
Wheeler, A.S. <i>Polygonia c-album</i> (L.) bred in June 1981 without <i>hutchinsoni</i> form	11
Wheeler, A.S. <i>Erebia epiphron</i> Knoch (Lep: Satyridae) reared on a two year life-cycle	28
Annual Exhibition	33
Field Meeting: Lullington, Sussex	16
Thetford Forest, Suffolk. Bricket Wood, Herts.	29
Pamber Forest, Hants. Blean Woods, Kent	31
Odiham, Hants 45. Ashted, Surrey	46
Indoor Meetings	27, 45
Council, Collecting permits sub-committee	24

INSTRUCTIONS TO AUTHORS

Contributions must be double-spaced with 3 cm margins either side to facilitate marking up. They should be typed if possible. Layout should follow that of the journal, but apart from underlining scientific names, no marks should be made to define typeface.

Authors of original papers of more than one page qualify for 25 free reprints. Extra copies (prices on application) must be ordered when proofs are returned.

MEETINGS OF THE SOCIETY

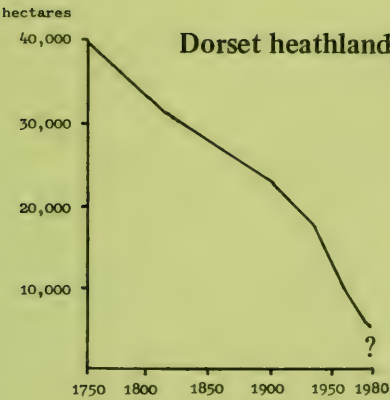
are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place 23rd October, in Chelsea Old Town Hall.

Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings.

The current Programme Card can be had on application to the Secretary.

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Proceedings and Transactions of
The British Entomological and
Natural History Society



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Editorial

Editor: R. W. J. Uffen, M.Sc., F.R.E.S.

Address: 4 Mardley Avenue, Welwyn, Herts. AL6 0UD.

with the assistance of:

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E.S. Bradford

A.H. Hayes



Plebeius argus ♀
L.D. Young

Maculinea arion
Tragacete, Spain
H.G. Phelps

Peribatodes
secundaria
B.F. Skinner

P. secundaria
B.F. Skinner

Ypsolopha mucronella
Sparsholt
J.R. Langmaid

Lysandra coridon ♀
Lulworth
R. Barrington

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ab. *extenuata*
A.S. Harmer

Dioryctria schuetzeella
Orlestone
J.M. Chalmers-Hunt

Zygaena carniolica
iberica (homoeotic)
W.G. Tremewan

C. palaemon
Argyll
P. Summers

Plebeius argus
L.D. Young

Argynnis paphia
ab. *sifkai*
R.S. Tubbs

Hipparchia semele
R. Revels
bred from *monocellata*

EDITORIAL

A parenthetical question.—A new edition of the *International Code of Zoological Nomenclature* is in preparation and this will continue the usage of article 54(d) that authors' names shall be enclosed in parentheses when a species has been transferred from its original genus. I can think of no practical value for this convention. Lepidopterists ignored it, with no apparent ill effects, as impractical of application until the publication of the revised *Check List of British Insects*. In many groups of insects, the bulk of species were described before criteria of relationship could be established, so most species have changed genus several times. There is no agreed way of defining the level at which a group should be accorded generic rank, so the bracketry is at the behest of every self-appointed reviser.

The inclusion of authors' names (whether parenthesised or not) should be unnecessary, except in taxonomic papers where the authorship of a name is actually under discussion. The insertion or correction of author's names and associated parentheses is a time-consuming chore for editors and meticulous contributors and we shall omit them in groups where writers can all be expected to work to ground rules that can be clearly recognised now and retrospectively by future readers. Most writers must rely on standard works for the interpretation of their species, so that the citation of authors' names is mere ritual and no guarantee of correct identification.

The rule of this journal is that nomenclature shall follow the sense of that in the revised *Check List of British Insects*. When an author wishes to use updated information, synonymy back to the check list must be provided. If the list must be totally superseded by new taxonomic work then the new work should be cited. Authors' names should always be used for those species which have swapped names from misidentification and for the remarkably small number of commonplace epithets that can cause ambiguity in indexing. The shrewd attempt by 19th century lepidopterists to incorporate an indication of family status into specific name endings enables one to place the majority of species whatever permutations are played with generic names. Would that the same could be said for the other orders.

Ecological observation and recording schemes.—In this issue the President's Address demonstrates the urgency for publishing surveys of sites of value for their invertebrate fauna, whilst other papers show how space-consuming accounts of just one group can be in conventional print. The vogue is to condense the information on distribution maps, but there is a concomitant risk. Entomologists, like ornithologists, are being encouraged to proliferate as mere list compilers. Mapping schemes demand an enormous amount of time in field work and would never take place if a price were placed on their participants' time. Unless detailed species record cards back up the lists, the whole of the field workers' experiences are being discarded and workers are not encouraged to make the ecological observations that are crucial to their use as local management advisers.

Mr. Stubbs warns us that the individual mapping schemes are spawning their own over-specialised study groups or formal societies. This is surely an expression of the wish to share experience as well as records. Examination of the journals serving the community of amateur entomologists shows that in the last two decades prowess in recording species has received an exaggerated importance at the expense of notes on practical techniques and insect bionomics. It is time for the pendulum to swing back. Journals should be used to record the location of detailed lists of records and the means of obtaining photocopies of them, not be filled with the lists themselves, which will be used by only a few people. The space released should be used to discuss the requirements that are crucial to the

continued existence of the species on those lists. I look forward to amateur entomologists finding more reward in their field work from deliberate observation of this kind and its publication.

OFFICERS' REPORTS

COUNCIL'S REPORT 1981

1981 has been a year of reasonable progress. The Society's membership remains at about 748. 37 new members were elected and there were 8 deaths, 15 resignations and 20 members were struck off or declared never fully elected (having not even paid their first subscription and entrance fee). At this point the Council express their gratitude to those members (fortunately in the majority) who pay their subscriptions on time, notify their changes of address and write in to correct errors in the members' address list.

The principal events in the year were financial and are dealt with in the Treasurer's report. First came the sudden rise in the rent when the Alpine Club realised that inflation had rendered the rent that we paid unreasonably low. The Alpine Club were very understanding about this but it was obvious that a rise in the subscription would be necessary. The second event was the very generous bequest from the late Mr. Cyril Hammond. There was much agonised discussion before it was decided that the bequest should not be used to defray the running expenses of the Society and help keep down the subscription but should be kept for capital outlay on special activities such as the Society's successful and by all accounts much appreciated publishing ventures.

The Indoor meetings program was particularly successful being again very varied and full of interest and new ideas. It is to be hoped that the Society's recent spirited attack on the, at one time rather neglected, microlepidoptera will be followed by a branching out into other orders and the indoor meetings program has certainly been calculated to encourage this.

12 Field meetings were arranged. The Council is grateful to Mr. Jackson for his period of service which is now ending. Mr. Prior is resuming the task of Field Meetings Secretary.

The Joint Meeting with the R.E.S. at the Alpine Club was very well attended and much enjoyed. There were four talks on the subject of "Courtship in Insects".

Our new Editor, Mr. Raymond Uffen is to be congratulated on taking over the job so competently. The Rev. David Agassiz produced a new membership list (resurrecting the very useful geographical list) and the Publications Committee published "An Identification Guide to the British Pugs" in the spring and "Larvae of the British Lepidoptera not figured by Buckler" by G.M. Haggett in time for the Exhibition. The Publications Committee have an active program for the next three years.

In Mr. Ken Evans's capable hands the Exhibition was well attended and attracted 99 exhibits. We are very grateful to Mr. John Muggleton and the rest of the catering team and, indeed, to everyone else who contributed to the success of the day. Unfortunately only 45 people were able to enjoy the cheerful (and delicious!) Annual Dinner arranged by Dr. McNulty, we hope that more members will be able to come next year.

The Society is very grateful to Mr. Russell Bretherton who has been carrying a heavy work load for the Society. He is handing over the job of distributing the Proceedings to Mr. David Yendall but will continue to handle the sale of Publications and past Proceedings.

TREASURER'S REPORT 1981

I have modified the presentation of the accounts in two ways this year. Firstly, I have abbreviated the detail and omitted pence so as to save space and cost when they are printed, but detailed breakdowns of particular sections will be provided to those who need them for running a particular activity. Secondly, I have separated the Special Publications from the normal running of the Society, as these have now assumed such large proportions as to obscure the latter if they are grouped together. This does not mean that the Special Publications Fund cannot be used for normal activities or vice-versa, but that it will be apparent when this is done.

We had a financial shock at the beginning of the year when our rent at the Alpine Club was more than trebled from £475 to £1475, half of the increase from January 1981 and the balance from January 1982, and this necessitated raising subscriptions for the coming year. We have, however, succeeded in containing the 1981 increase without a deficit on the Income and Expenditure Account. This was achieved because the changed Housing Fund Regulations permitted the interest on this to be used towards rent, high interest rates brought a record high return on our capital, and sale of surplus equipment at the Exhibition made a substantial contribution. However, you will see that the general running of the Society cost £5148, whilst receipts from subscriptions, although a little up, totalled £2849, or only a bit over half the cost of membership. In other words, subscriptions would need to be almost 100% more for the Society to have met its 1981 costs entirely from these, and over 100% more for 1982, when the second half of the recent increase takes place, and the postage rates go up, in addition to other cost rises. In fact, the new subscriptions average about a 50% increase, so the Society's costs will still be a lot more than members' subscriptions cover.

The Special Publications continue to sell well, and the success of past publications means that no financial problems can at present be foreseen in financing the future plans of the Special Publications Committee.

We received an interim payment of £10,000 from the estate of our late member, Mr. C.O. Hammond and there may be some more to come. Your Council decided that a sum of this magnitude should not be treated as normal income, but set aside pending a decision on how it could best be employed and, in the meantime, any interest that it earned should be added to the capital. It is being held temporarily in a National Savings Bank Investment Account, and interest of nearly £700 has been added.

Once again, we thank Mrs. S.B. Walker, the wife of our Assistant Treasurer for subscriptions, who is still abroad, for continuing to look after this side of the work. This is an even more onerous task in a year when subscription rates change. Our thanks too to our honorary auditors for completing the audit in time for the Annual General Meeting.

SPECIAL PUBLICATIONS ACCOUNT FOR 1981
(Publications for sale)*

Opening stock saleable Publications	1065	Sales of Publications	3763
Pug Plates	633	Closing stock of saleable Publications	3028
Production of new Publications	2658		
Distribution costs	182		
Surplus to Special Publications Fund	2253		
	<hr/> 6791		<hr/> 6791

*Special publications were included within the "Publications Account" for 1980 and earlier.

British Entomological and Natural History Society

PUBLICATIONS ACCOUNT FOR 1981

(Publications free to members)*

	1980	Expenditure	1981	1980	Income	1981
	£		£	£		£
1488 Opening stock Spl. Publications				2040	Sales proceeds & Plate contributions	
2829 Production of Proceedings			2930			812
Production of Membership List			220	1065	Closing stock Spl. Publications	
326 Distribution Costs			470	1538	Net cost to Income & Expenditure a/c	2808
	<u>4643</u>		<u>3620</u>	<u>4643</u>		<u>3620</u>

INCOME AND EXPENDITURE ACCOUNT FOR 1981

1538 From Publications Account	2808	2793 Subscriptions	2849
597 Rent and Insurance	1154	Interest and Dividends	1940
365 Stationery and General Expenses	354	Donations and Bequests	32
18 Indoor Meetings and Exhibition	294	Surplus on sales (Ties, Surplus Equipment and Christmas Cards)	291
64 Subs/Donations to Other Societies	57	Surplus on Annual Dinner	36
676 Office Equipment			
2378 Excess of Income over Expenditure	481		
	<u>5148</u>	<u>5636</u>	<u>5148</u>

*Special publications were included within the "Publications Account" for 1980 and earlier.

AUDITORS' REPORT

In our opinion the annexed Balance Sheet gives a true and fair view of the Society's affairs as at 31st December 1981 and the Income and Expenditure Accounts give a true and fair view of the Society's results for the year.

A.J. Pickles, FCA
R.A. Bell

BALANCE SHEET AS AT 31st DECEMBER 1981

		FUNDS	
1980			1981
£			£
8655	General Fund — Opening balance	12775	
854	From Reserve Fund (1980). To Special Publications Fund (1981)	3028	
		9747	
12775	888 Gain on Investment Sales	481	10228
	2378 Excess of Income over Expenditure		
	192 Library Fund — Opening balance	115	
	72 Income	451	
	264	566	
115	149 Expenditure	116	450
	2072 Housing Fund — Opening balance	2308	
2308	236 Income		2308
	Special Publications Fund — Value of stock transferred	3028	
	1981 Surplus from Sales	2253	5281
	Hammond Bequest	10000	
	Interest	678	10678
	2477 Hering Memorial Fund — Opening balance	2580	
	173 Gain on sale of Investments		
	282 Income	287	
	2932	2867	
2580	352 Expenditure	177	2690
17778	TOTAL FUNDS		31635

THESE FUNDS ARE REPRESENTED BY

1980			1981
£			£
	Investments at cost (details appended)		
7916	General Investments	7913	
10086	2170 Hering Memorial Fund Investments	2170	10083
	Stock		
1697	Special Publications at cost	3028	
1881	184 Coloured Christmas Cards	102	3130
	(The value of the library, collections, ties and other publications is not included in the accounts)		
	Liquid Assets		
105	P.O. Savings Investment Account	10799	
698	Debtors and Advance Payments	1074	
6011	Cash on Deposit	7824	
409	Cash on Current Account	110	
	7223	19807	
	852 Payments in advance received	336	
5811	560 Amounts owed and provisions	1049	18422
17778			31635

SCHEDULE OF INVESTMENTS AT COST AS AT 31st DECEMBER 1981

General Investments of the Society

		£
£ 800	Agricultural Mortgage Corporation 9½% Stock 1985-88	646.49
1010	Drayton Premier Investment Trust 25p Ordinary Shares	1398.21
£1250	Greater London Council 9½% Stock 1980-82	1100.14
130	Shell Transport & Trading 25p Ordinary Shares	477.79
150	Unilever 25p Ordinary Shares	248.45
4098.06	Treasury 13¼% Loan 1995	4041.44
		<hr/> 7912.52

Hering Memorial Fund Investments

£ 800	Agricultural Mortgage Corporation 9½% Stock 1985-88	646.48
£ 300	Greater London Council 9½% Stock 1980-82	291.97
189	Midland Bank £1 Ordinary Shares	459.66
280	Shell Transport & Trading 25p Ordinary Shares	771.83

LIBRARIAN'S REPORT 1981

53 of our valuable books, sent to the binders in 1980, have now been returned to the library handsomely rebound, thanks to a grant from the British Library. I applied for a further grant to bind some of the back-log of our foreign periodicals and the British Library have generously agreed to make a further grant of £514 for this purpose.

Under the will of our late member, Cyril Hammond, the Society was bequeathed the whole of his library: this has now been catalogued. During the last few years gifts and bequests have doubled the size of your library and it is now very comprehensive. This has meant great pressure on available space so that we have been compelled to dispose of some of our less important duplicates and some books that were trivial or of little practical use to the membership.

In my last report I appealed for coloured slides of orders other than the Lepidoptera. I am happy to say that as a result of this appeal we have received and are to receive a considerable number of such transparencies. So much for those who say that no one reads the reports of the Officers at the A.G.M.

I wish to thank Mr. E. Classey, Mr. S. Jacobs, Adm. Torlesse and Mr. P. Sokoloff for gifts of books and publications, also Mr. A. Callow for his fine gift of coloured slides. For their help during the past year in re-arranging, classifying etc. the books and journals I thank Messrs. A. Stubbs, M. Hadley, E. Bradford, I. MacLean and W. Parker. I must also thank particularly my Assistant Librarian Steven Miles for all the help and support he has given me. I do not know whether he will thank me of course as I am giving up the Librarianship and he has agreed to succeed me as your new Librarian. I have every confidence in his ability and he can now look to me for help and assistance.

G.P.

CURATOR'S REPORT 1981

The final part of the Torstenius collection of Scandinavian Lepidoptera was shown at the Annual Exhibition at Chelsea Town Hall on October 24th last year. As in previous years the collection was arranged and displayed by Mr. B. Ashby. Two ten drawer units are complete and installed in the Society's rooms. The remainder, exhibited at Chelsea, complete the third and final unit of the collection. In due course a list, plus notes on the collection, will be made available. Included amongst the store boxes and other surplus items disposed of during the

exhibition were many books from the Baron de Worms library. A sum of £143 was realised during the day.

The last six store boxes of the Coleridge collection of Palaeartic butterflies have now been delivered. The specimens are pinned in temporary drawers, until cabinet space becomes available.

It was learned late in 1981 that Mr. Bernard Goodban had died. He has bequeathed his extensive collection of Lepidoptera to the Society. A large number of species were bred and include many aberrations. The collection is now available for study in its six ten-drawer Hill units.

A start has been made on the re-arrangement of cabinets and drawers containing some of the smaller orders of insects. Included are the Trichoptera, Ephemeroptera, Plecoptera and the Neuroptera. I would appeal to members to collect, and if possible, to breed specimens of these orders for donation to the Society's collections.

During the year members have availed themselves of the many duplicates provided and the main collections have been well consulted.

Finally I extend my thanks to the assistant curators, Mr. B. Ashby, Mr. G. Prior and other members for their assistance during the year.

E.S.B.

PRESIDENTIAL ADDRESS

by ALAN E. STUBBS

29th January 1982

I. REPORT

The thing that has struck home very forcibly during my term as President has been the energy and dedication both of the Society's Officers and of those other members who take on the inconspicuous, and sometimes thankless but essential tasks necessary to the successful running of the Society. Moreover it is the friendly and co-operative spirit which permeates Council, as in Society functions, which is so conspicuous. The membership owes a great debt to these stalwarts and it is my pleasure to thank them, and Council as a whole, for the loyalty and support they have shown.

In a year of many changes of responsibility, it is timely to pay tribute to several of our stalwarts. Particular thanks should go to Russell Bretherton who, far from sitting back in retirement, has been taking on many of the burdensome chores, in particular as Distribution Secretary. The fact that Council has now split his task into several jobs speaks for itself. Another of our anchor men has been Gaston Prior, who has held so many posts over the years, and is now retiring as Librarian. Those who attend London meetings will have noticed the way that the basement room has been infinitely tidier, better organised and better cared for in recent years — this has been due to the driving force of an active Librarian, in conjunction with his close colleague, the equally active Curator — those two have been quite a combination. Mr. Bretherton and Mr. Prior will continue to serve the Society as Sales Officer and Field Meetings Secretary respectively. I also wish to congratulate the Honorary Secretary who has so successfully met the challenge of her first year in Office and also the Honorary Editor for overcoming the initial difficulties of taking over at short notice.

One of the most important initiatives embarked upon in recent years has been our series of special publications. This year has seen the fruition of two new works, of which that on Pugs was the first previously unpublished title. The Society has its Publications Committee to thank, especially the dedication and

energy of two past Presidents, Rev. David Agassiz and Ralph Tubbs, and their forward planning should serve the membership well. Somehow, Rev. Agassiz has also managed to produce a membership list, among other tasks, despite the turmoil of moving to Essex.

Though the Society is vigorous and healthy, there are a number of trends which are worrying. It is increasingly difficult to find people able and willing to take on the tasks of running the Society. Though things have picked up somewhat, we have been through a period when London meetings were not as well attended as in the past and the attendance at the traditional Annual Dinner was exceptionally low this year. At the Annual Exhibition there were far less macro-Lepidoptera on display than usual (possibly due to the bad season) though most encouragingly micro-Lepidoptera exhibits were up enormously. Some people felt that the number of members attending the Exhibition was somewhat down. The increased costs of travel, and the fact that less people commute into London to work, has a strong bearing on attendance of Society functions. Field meetings range from a high attendance to virtually nil. These points need to be made, for if we are to remain a vigorous and healthy Society, then this will only be so if there is vigorous support for its activities. It would be a shame if traditional events have to be reduced or curtailed, though at the same time the Society must be prepared to evolve with the times. The Society is in a very sound state at present, but it is not amiss occasionally to remind the membership that it is their Society – and it will become what they make of it.

It is customary for the President to note the deaths among the membership during the year.

Mr F.V.L. JARVIS joined the Society in 1938. He lived in Sussex and had an interest in Lepidoptera and general entomology. He will be remembered in particular for his published research on the relationship between *Aricia agestis* and *A. artaxerces*.

Mr W.H. SPREADBURY had been a member since 1943 and resigned only a few months before his death. He led several field meetings in Surrey as a lepidopterist with a keen interest in autumn fungus forays. He was a versatile natural history photographer with quarter-plate cameras and some of his pictures grace our earlier Proceedings.

Mr R. PICKERING was elected in 1963. He was a well known Sussex lepidopterist who led field meetings to such favourite localities of his as Mens and the Cut. He had a strong interest in migrants and added the noctuid *Harpyia milhauseri* (F.) to the British list.

Miss VERA DICK will be remembered for her sterling work as librarian and her active help to the membership in the early 1970's. She resigned a few years ago.

Lt F.W. SMITH was a life member who joined in 1941. He was a lepidopterist and hymenopterist living in Newbury.

Mr. F.H. EDWARDS of Worthing was a lepidopterist who joined in 1949.

Mrs M.J. FROWHAWK, the widow of the late F.W. Frowhawk, had been a member since 1951. It was of considerable pleasure that she should have maintained her husband's association with the Society.

Mr B. GOODBAN had been a member for 45 years. He specialised in the breeding of geometrid moths and succeeded in producing some remarkable variations of such species as *Abraxas grossulariata* and *Selenia bilunaria*. His collection, in six cabinets, is now with the Society. In 1955 in conjunction with W. Minnion, he discovered *Xanthorhoe biriviata* near Harefield.

Major General C.G. LIPSCOMB CB, DSO died in January, one of our longest standing members having joined in 1933. He lived in Wiltshire and was well known for his interest in butterflies. Some of his specimens are illustrated in Russwurm's *Aberrations of British Butterflies*.

PRESIDENTIAL ADDRESS PART II

CONSERVATION AND THE FUTURE FOR THE
FIELD ENTOMOLOGIST

by ALAN E. STUBBS

Nature Conservancy Council, 19/20 Belgrave Square, London SW1X 8PY

It is a sign of the times that this Presidential address should consider conservation, a subject scarcely known to previous generations but one which now impinges on our activities ever more closely. I wish to review how, in a rapidly changing scene, entomologists as individuals and as a Society are being affected and the repercussions for the future.

I speak, incidentally, as one who was an amateur for many years and in that capacity was entomological adviser to Surrey Naturalists' Trust before a temporary move from London. My concern for the future of field meeting localities in Surrey was the subject of my first talk and paper with this Society, then the South London (1967, pp. 95-97). It was only in the later years that I metamorphosed from a professional geologist to an entomologist within the Nature Conservancy Council, with a responsibility for developing a strategy for the conservation of terrestrial invertebrates.

THE BRITISH INVERTEBRATE FAUNA

Let us first consider what is at stake in conservation, our starting point being the fauna and flora of the British Isles. Table 1 presents this information diagrammatically.

The most obvious point, to an entomologist, is that the conservation bodies concentrate their knowledge, expertise and efforts towards the flowering plants on the one hand and the vertebrates on the other. Thoughts on ecological communities, the management of those communities and the selection of priority sites for conservation are based upon approximately 2080 native vascular plants (excluding microspecies) and about 300 native breeding vertebrates in freshwater and terrestrial habitats (I am here excluding non-breeding migrant birds). Moreover virtually all assessments and decisions on the impact of development proposals, or changes in agricultural and forestry practice are based upon such criteria.

But what of the 22,450 species of insects and 3,130 species of other invertebrates? (Those are the known ones: the true total may be approaching 30,000.) As animals, all these species are ultimately dependent on plants and vegetation structure. Every choice, decision and action based on vegetation has immense repercussions as far as the invertebrates are concerned. How can conservationists seriously believe that they can manage ecological communities, and pass them on intact to future generations, when they are ignoring the predominant animal life of Britain? Are not insects playing a major role in pollinating flowers and by their feeding activities affecting the vigour, reproduction and competitiveness of wild plants, just as they do in a garden?

The common complaint has been that invertebrates are too numerous and difficult to deal with. As it happens the total of known British insects is almost the same as the world total of vertebrates, excluding fish, and no one has seriously suggested ignoring most of the vertebrates because there are too many. The fauna is only too difficult to handle if one gets mesmerised by species totals — when the needs of the groups are distilled (as in the series of NCC publications) the whole subject becomes more manageable.

Won't insects look after themselves? No, they will not. Since 1949, when the government body responsible for nature conservation was set up, we have

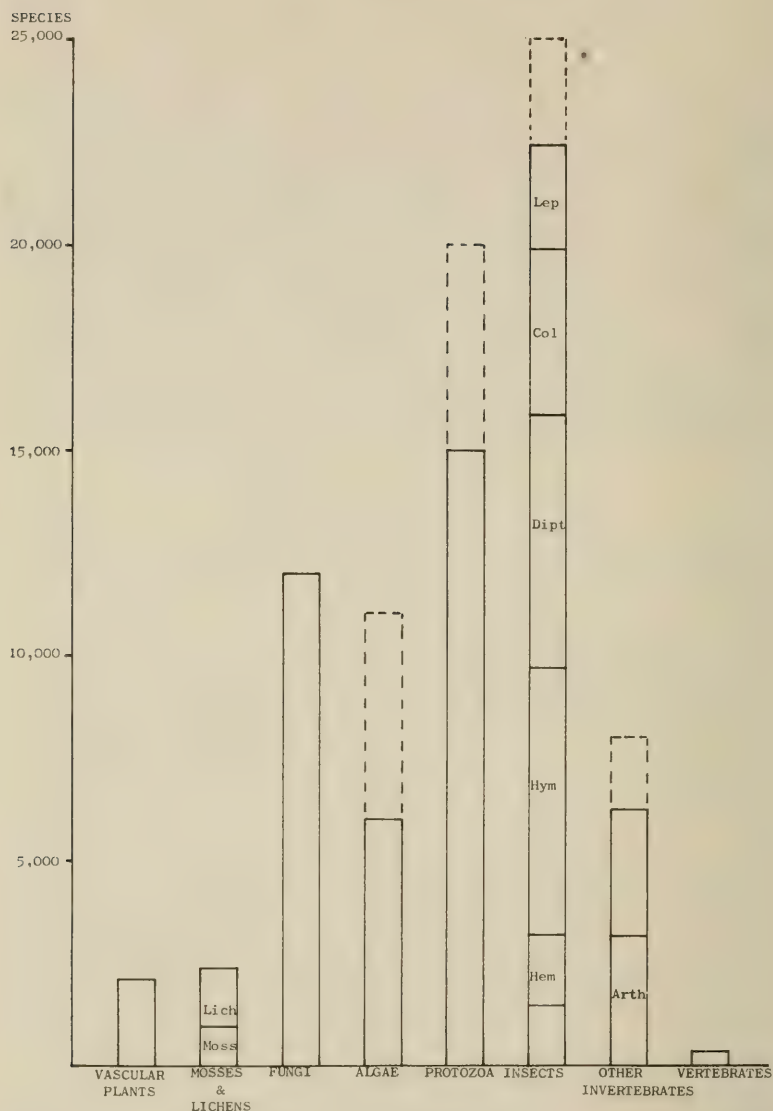


Fig. 1 Species diversity of invertebrates compared with the rest of the fauna and flora of Britain in freshwater and terrestrial habitats (including saltmarsh). The extension of columns shown in dashed lines indicate provisional estimates to take account of poorly known groups, likely additions or levels of uncertainty.

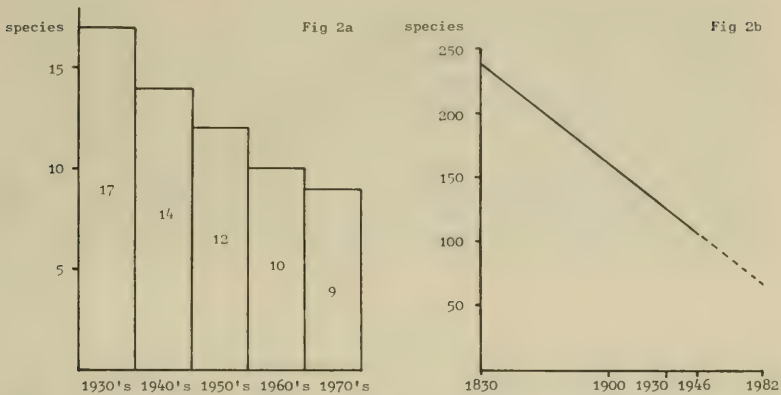


Fig. 2 a – the number of dragonfly species at Richmond Park, Surrey, has declined by almost a half since the 1930's due to tidying up of ponds. b – the aculeate hymenopterous fauna at Hampstead Heath, N. London, has declined at the rate of about one species per year, or nearly 60% by 1946.

seemingly lost 10% of the dragonfly fauna of Great Britain whilst on some National Nature Reserves, which were rich in butterflies in the 1950's, we have lost 40% of the species. In other words simply selecting a series of 'representative' ecological sites for conservation and maintaining the *general* ecological nature of such places will not do. There are certain sites which must be chosen for invertebrates and their management may have specific requirements. The lesson of the past must not be forgotten, but the necessary advice and observations must come from the entomologists of today.

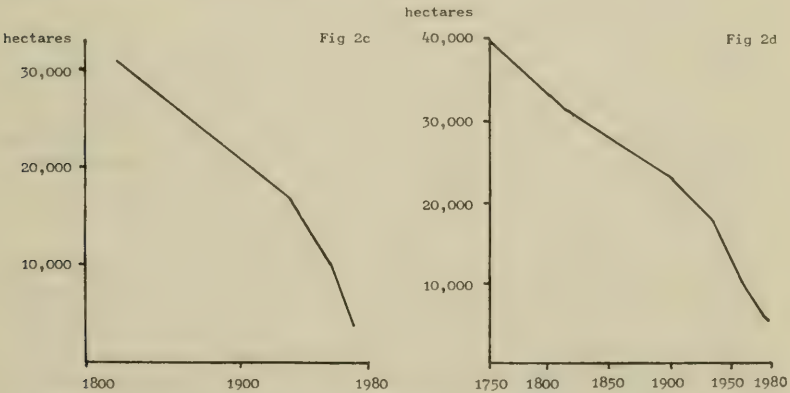


Fig. 2 c – the loss of 90% of chalk grasslands in Dorset between 1811 and 1973 (based on Jones, C.A., 1973 *The Conservation of chalk downland in Dorset*. Dorset County Council). d – loss of heathland in Dorset (based on Webb, N.R. and Haskins, L.E., 1980. *Biol. conserv.* 17: 281-296).

One may cite many other examples of declines, as any ardent scanner of BRC maps will know. Always bear in mind that on most maps a post-1960 black spot now represents a span of over 20 years, and an awful lot has happened to the countryside in that time. Entomologists know of the way in which their species are declining but for the most part are content (?) to simply watch as spectators.

There are many examples of declines on particular sites. In Richmond Park, the dragonfly fauna has suffered a 50% loss of species since the 1930's because ponds and marshy ground have been tidied up for amenity purposes (fig. 2a). A similar loss has affected Bookham Common in Surrey. On Hampstead Heath a rich fauna of nearly half the British bees and wasps has declined at the rate of one species per year over a period of a century (fig. 2b). Again amenity management is largely to blame — on otherwise 'safe' sites!

HABITAT LOSS

There cannot be a single member, even a junior member, who does not know of good entomological localities, or at least areas of nice countryside, which have not been ravaged in some way. Were there a government policy to destroy 80% of all natural grasslands, there would be uproar. Things do not happen that way, changes are piecemeal and insidious. It is not until one steps back and takes an over view of what is happening that one appreciates the scale of changes. Consider the following examples.

Since 1945, approaching 50% of the primary lowland woodland of Great Britain has been destroyed (complete removal or conversion to conifers).

Only 0.1% of the mosses of Lancashire remain, and even that is wrecked.

Since 1750, 86% of Dorset heathland has been destroyed (lost to agriculture, forestry and building) (fig. 2d).

Since 1811, 90% of Dorset chalk grasslands have been destroyed (fig. 2c).

In Bedfordshire 82% of ponds have been lost since 1910.

In the whole of the East Anglia (Anglian) water authority region, there is scarcely a single stretch of river or stream bank which has not been 'improved'.

The worrying thing about such statistics is that in graph form, as with the Dorset heathland examples above, one can see that the end of the graph is looming fast. What it amounts to is that within a decade, and certainly by the end of the century (just 18 years away), in many part of Britain the only examples of good habitat for studying insects will be on the remnants safeguarded for conservation.

To emphasise that conclusion, consider fig. 3 which shows the area of land use changes which can be forecast. Forecasts are very unreliable, but projecting current land use change to the year 2000 and including the Reading Report proposal (as yet not policy) for future forestry, one would compute a land use impact equivalent to a belt 100 km wide from London to Edinburgh. If even half of that change takes place, the repercussions will be far reaching.

It must be borne in mind that government post-war policy has been to increase food production to reach self sufficiency. However, momentum carries on beyond self sufficiency with various crops such as barley. Enormous sums of money are poured into agriculture each year — £540 million in 1979/80 — resulting in vast destruction of habitat, whilst only £7.3m was available for the total functions of the Nature Conservancy Council. The EEC agricultural policies and subsidies make respite unlikely in the short term. The intensification of agriculture in East Anglia and the Midlands is moving westwards and space for extensive further forestry would have to be in the uplands. In other words, everything is possible as regards habitat loss and nothing is safe unless conservation principles are accepted as a priority.

LEGISLATION

In some entomological circles, the very mention of legislation is like waving a red rag to a bull. The trials and tribulations of recent years have brought many people to the sharp realisation that conservation will not go away – it's an issue they have got to face, like it or not. The unfortunate thing is that because attention has been focused on legislation, conservation has appeared to be obstructive when its purpose should be constructive.

The complaint, largely justified, is that the emphasis in Parliament has been directed at species legislation. This is seen by many entomologists as a pointless and irrelevant diversion – conservation should concentrate on saving habitat. Since the Society is publishing in full a resume of the new Wildlife and Country-side Act, I will be brief and emphasis one theme.

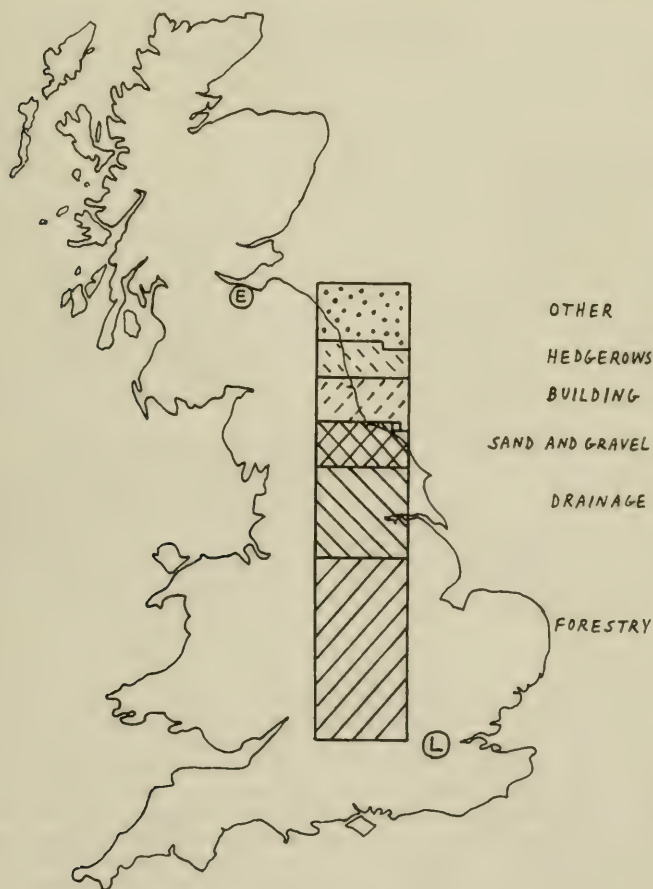


Fig. 3 Forecast of further land-use change by the end of the century. Based on a projection of rate of current land-use changes and mooted forestry proposals. Area indicated is 5 million hectares, equal to 5000 10 km squares.

The reason entomologists feel so helpless over legislation is that they have not sufficiently foreseen the need to develop channels of liaison and understanding with the bodies which have influence. We need to build our bridges in anticipation of future needs (hence the Society's membership of Wildlife Link). It is counter-productive to shy away from legislation issues because of the fear that we are going down the slippery slope towards a total ban on collecting, leaving others to view all entomologists as selfish kleptomaniac collectors. The best insurance is to work with the conservation movement, this to my view being the only practical way of evolving a proper relationship among those whose understanding we need. There are very sound arguments against going down the slippery slope, but it is other more powerful groups than ourselves that have got to be receptive to our small voice.

THE CODE FOR INSECT COLLECTING

When this code was published in 1972 by the Joint Committee for the Conservation of British Insects (on which the Society is represented), few entomologists had given conservation more than passing thought. It was a subject to do with birds and plants and as an avoidance mechanism was thought by many entomologists to be unnecessary with insects. In the event the Code gained an acceptance which has grown over the years.

Through the endorsement of the Code by the Societies, entomologists gained a greater respect within the conservation movement and the Code is now often the basis of conditions for permits. Where entomologists failed was in not sufficiently following up on the initiative of the Code. It was treated as a matter of honour settled rather than the basis of negotiation for a better permit system.

Where the Code has been conspicuously ignored is on the question of rearing and releasing. This activity is very widespread, particularly among butterfly enthusiasts. The code asks that the Committee be consulted yet there have been very few instances where this has happened. The blatant disregard for this part of the Code is worrying the conservation bodies and undermines confidence that other parts of the Code are being adhered to.

Whilst many entomologists may have initially seen rearing/release as the best way to contribute to conservation, it is pointless unless the management, carrying capacity and safeguard of the site is satisfactory. I take a hard view on this (largely set out in *Ent. Rec.* 1966, pp. 16-19) though others feel that little harm is done. Either way, if there is a Code then the credibility of entomologists will be enhanced if they follow the guidelines. It would be far better to contribute in an open and positive way rather than surreptitiously and there are many other more urgent ways of contributing to conservation.

TRADE IN INSECTS

It will be apparent to many entomologists that there has been a substantial increase in trading in specimens. Some years ago there were a few traders who served a valuable purpose in re-cycling specimens from old collections – surely a good answer for someone who wants a particular rare and vulnerable insect. In the last 10 years there has been an accelerated growth of people participating in trading, with everything from butterfly farms and museums, to a table once a year at an exhibition, to simply a home trading address. We have not yet reached the situation in Germany where most towns have an annual trade fair, but there are a lot of people starting to jump on the band wagon. Clearly money is there, and the prices for even common butterflies keep shooting up. I wish to sound a warning note. There are traders for whom there is considerable respect, but others are on less firm ground. There must be concern that moral standards should not slip as more people join in. It is difficult to believe that it is only old specimens

which are sold or that all stock is bred on a satisfactory basis. There are accounts of people collecting large numbers of rare British butterflies to sell to traders or to trade direct. Livestock is apparently being obtained in quantity by collecting early stages in the wild. Unless irresponsible activities are suppressed, there is bound to be a backlash with legislation. Responsible entomologists will be at risk to find themselves tainted and penalised by the activities of the minority.

Thus a sensible balance must be maintained. The sparking of the interest of future generations of entomologists is to be encouraged and the public sympathy towards support for insect conservation can readily be stimulated via books, TV films or thoughtfully presented butterfly farms. The place of trading in British and foreign insects is a matter of opinion but the Societies have a responsibility to use their influence should trading become identified as a threat to wild populations of species. The only reasonably firm example of a British species being exterminated by collecting, the New Forest Burnet in its type area, was not through the activities of responsible individuals, it was through irresponsible over-exploitation by commercial collectors.

RELATIONS WITH CONSERVATION BODIES

Some very hard things are said about various conservation bodies, sometimes justified and sometimes not. There are faults on both sides. Rather there should not be sides. If there is a fault, then one should look back about 20 years, for entomologists often lost their chance with the formation of county naturalists' trusts. By leaving other organisations to deal with conservation, and by sitting back or waiting to be asked, it has been inevitable that non-entomologists have developed the policies. It has only been in the last five years in my view that entomologists have really begun to wake up to the fact that conservation might actually be relevant to them. There is now a major gulf in understanding to close, both as regards educating those involved in conservation that insects matter and with respect to attitudes regarding collecting. To underline this point, where entomologists have worked closely with their local county trusts or Nature Conservancy Council staff, there has often been the most cordial relationship. Derbyshire Entomological Society membership as a whole has open access to all trust reserves in the county for instance. In many counties there is such surprise that an entomologist should be available and willing to record sites that there is open welcome. Most of the difficulties lie within a hundred miles of London — here there are large numbers of entomologists but few of them are known to the conservation bodies and there is considerable potential pressure on some reserves with rare species. The difficulties I speak of are, inevitably, access and permits. A system which is seen to be fair is needed.

Entomologists have historically been used to more or less unrestricted access on most of their collecting forays, given some necessary courtesy on land which is obviously private. It thus comes as a nasty jolt to find more and more areas taken over by bodies that now insist on permits. Not only is it a superhuman task administratively to obtain all the permits you might need in a year, especially if you travel out of home range a fair bit, but it is exceedingly annoying having travelled a long distance, or whilst touring on holiday, to find more and more restrictive notices. Life is even more frustrating when there is a most unhelpful response when trying to obtain access permission, even if it is possible to contact someone in authority.

A land managing body will often see things very differently. Here is an entomologist who wants to collect, a taboo subject since botanists and ornithologists have been weened (with some legislative force) to deny collecting. Moreover, the local man, perhaps a warden, may have a deep conviction as custodian for the local wildlife that any collecting is morally wrong. His unhelpful response may

also be conditioned by some pretty nasty episodes with other entomologists – the one who set up his light trap in a reserve without permission and by the following morning all the prized orchids were trampled flat, or the one who took Large Copper. And it sticks a long time if a warden has been told to go and get lost by an entomologist who has been rather undiplomatic. Also, it must be borne in mind that many reserves are not owned, they are on leases or agreements sometimes entailing severe restrictions on access. An estate may only agree to a reserve on condition its pheasant shoot is not disturbed, and the warden called out by the game keeper in the middle of the night to deal with an unknown 'poacher' will not forget the episode quickly. A recent trend has been towards people found collecting butterflies on reserves with the excuse that they thought it best to collect there because butterflies would be more plentiful – that excuse is wearing a bit thin in some quarters. Such incidents may be the exception, but bad news sticks.

Bearing in mind the phenomenal rate of loss of habitat discussed earlier, and the bleak outlook in this front, one must concede that habitat protection is imperative. Without the action of the conservation bodies in obtaining reserves and safeguarding other areas, many collecting sites would not survive. Equally, it is all to the good that local authorities, the National Trust, the Forestry Commission etc are taking an increasing constructive concern for conservation, and it is not surprising that they have woken up to exercise some interest in who is doing what on their land, their bye-laws being invoked. Here entomologists find themselves trapped. On the one hand site conservation is desirable, on the other hand it can lead to unwelcome restrictions.

Here we come to the issue which is imprinted in so many many entomological minds. If entomologists take a more open and constructive course and tell the conservation bodies where the rarities are, won't the conservation bodies then stop any further collecting? Yes, that could happen, especially if treated on a local basis. Why should we not reverse that stance? If the conservation bodies want sensitive information, then it is they who must bend and adopt a satisfactory policy towards collecting. There is just one problem. Since these bodies do not necessarily see the need for such information, it is not a seller's market. The conservation bodies therefore have to be educated into a higher plane of concern for invertebrate conservation.

A constructive view. In chatting to entomologists about conservation issues, there often emerges a normally unspoken pride in the fact that most of what we know about the British fauna has been achieved by successive generations of amateurs. That truth holds today as much as it ever did, in fact we are on the growing crest of a new wave as BRC schemes create an unprecedented stimulus – we should not underrate the historical significance of these schemes, currently covering about 40 groups of terrestrial and freshwater invertebrates. The amateur has done a great deal to improve taxonomic knowledge and many of the reference books originate from writers of such status. In emphasising the amateur, it should not be forgotten that many of the professionals who have contributed to knowledge of field entomology have done so as a hobby or with an outlook identical to that of the amateur. Thus our knowledge of the taxonomy, distribution and ecology of the British fauna is heavily dependent on the field entomologist. Such subjects are not static, they are being advanced in understanding all the time.

The conservation bodies, if they are to function as we would wish, need information and advice. There is only one source of any consequence as far as entomology is concerned. Conservation bodies require information as to which sites are important and why. They also need to know what fauna occurs on reserves and other sites, the significance of that fauna and the ecological requirements that should be taken into account in management. Further, there is a

need for monitoring, especially of the more significant species – a species list is not a once and for all matter.

Such a role fits in neatly with the activities of the field entomologist. It gives good reason for surveying sites and for returning to monitor the species of special interest. It also enables the entomologist to be seen as useful and opens the door to closer contact, understanding and symbiosis with other bodies.

It is in this light that the Invertebrate Site Register, launched by the Nature Conservancy Council, becomes logical. If any worthwhile effort is to be made to prevent the loss or mis-management of sites valued by field entomologists, then the facts must be available to bodies which can take action on their behalf. In conjunction with the fact that the new legislation makes the status of Sites of Special Scientific Interest much stronger, the future of invertebrate conservation lies very much in the hand of entomologists. If entomologists don't do anything for insect conservation, no one else will – or at least you have seen the past problems of leaving the action, (ie. often inappropriate action) to others. The Invertebrate Site Register opens opportunities to create the atmosphere and liaison links that the field entomologists needs. The conservation movement needs help and those who assist are well placed to find themselves welcomed on conservation sites in the future.

There are many other opportunities to build on. The Society has received an invitation from the Ministry of Defence to help survey its ranges and other sites with magnificent stretches of prime habitat, normally closed to all access. This is an opportunity too good to miss but it underlines the point that with the right approach there are other major land holding organisations that would be just as welcoming to field entomologists. The expertise given by specialists for the Red Data Book for Insects will help to show entomologists to be constructive and the maps from BRC schemes demonstrate to the outside world that entomologists are well capable of doing much more than secretly amassing specimens. What is most disappointing is the scarcity of active support for the Joint Committee for the Conservation of British Insects.

COLLECTING

It will be noted in the last section that I have switched from speaking of collecting to the term survey. The historic image of 'the collector' is a barrier which must be overcome in a practical manner. It is a species list, that is survey, which will be regarded as the result which justifies access to a reserve, especially if there is annotation on the status, ecology and significance of the rarer species recorded. It is the frequent failure to provide such lists that has enhanced the image of the entomologist as one whose sole purpose is to build up a personal collection like stamps.

What most of us mean by collecting is the retention of voucher specimens. There are many groups of insects where it is not possible to identify everything in the field. That even applies to the macro-moths, and most obviously where genitalia preparations may be necessary in order to identify a species. Also without the attention to detail which comes from a personal reference collection, taxonomic advances would be stifled – the moths again being a good example where splits and additions have been frequent in recent years. To the coleopterist subtleties of shape and sculpture can only be appreciated through having reference material and as a dipterist I have a reference collection of flies, and indeed other insect groups, which I regard as an integral part of the pursuit of field entomology. It is also impractical to study genetic and geographic variation without recourse to collecting.

Ah! that sounds all very well, but we are after the rarities, aren't we? Yes! there's often an element of truth in that, and there are rarities which are both

easy and difficult to identify. It is true that ornithologists may be motivated to travel hundreds of miles to see a rare bird, without the facility to pin and set it. It is very difficult to draw hard and fast guidelines through such a grey area of what is and is not justified in the taking of rarities. One may consider that the numbers of eggs laid by an insect puts it in a very different category from a bird or that by rearing or releasing it is possible to return more specimens that were removed in the first place. The problem is not really one of rarity, it is a question of whether or not it is possible to collect a high percentage or even the total population of an insect. With certain insects the answer is yes, it is possible to collect them out and some of the most critical ones have been protected in the Wildlife and Countryside Act to emphasise this point. With sensible behaviour, as embodied in the Code for Collecting Insects, and with sense in not depleting very small populations, it is unlikely that minimal voucher collecting is doing damage. But if entomologists claim that their collecting does no harm, why is it that they withhold information on the occurrence of rarities? There is often the fear that news will get out and other people might collect. So many insect populations are restricted and small that whilst one sensible person may do no harm, a succession of sensible people, or just one irresponsible person, can create havoc, or at least fear. Entomologists lose credibility by inflaming fears that they are all nasty 'collectors'. If trust is to be built up, that must include trust that the conservation bodies will treat sensitive information responsibly.

A more controversial point is in relation to butterflies. I started by collecting butterflies at an early age and was a lepidopterist for some years. One does not wish to suppress youngsters from developing such an interest in entomology. However, as a statement of forecast, I believe that attitudes will change in the next 5 to 10 years such that collecting butterflies will be largely foregone by the responsible entomologist. Such a momentum is already under way as it is appreciated that so many species are becoming reduced to small populations. If the conservation bodies are to take invertebrate conservation seriously then they will be (indeed already are) treating butterflies as a priority. Since butterflies may be identified, surveyed and monitored without recourse to collecting, there is going to be no way that collecting (in the traditional sense) will be seen as necessary or justified. I believe entomologists will have to concede that point if they are going to be viewed with trust as regards collecting policy on other groups.

NEW BREEDS OF ENTOMOLOGIST

The field entomologist used to be fairly easy to classify. Collecting was considered normal and those with huge series of specimens were looked upon as merely eccentric. As insect populations and sites have become smaller, collecting long series has largely become a thing of the past. Today most entomologists would regard themselves as responsible, having small collections and treating rarities with restraint.

However, there are new breeds of entomologists. Ornithologists have a quiet time in mid-summer so increasing numbers of them are becoming butterfly and dragonfly 'twitchers'. These people do not collect, they tick off what they see each year. Also large numbers of the general public, including naturalist's trust members, are taking a direct interest in observing and photographing butterflies. RSPB has a membership of 458,000 including juniors and the total membership of voluntary conservation bodies is said to be several million. In other words the field entomologist as we have known him could soon be swamped by hordes of observers of insects. The British Butterfly Conservation Society has shown an impressive growth in membership and is likely to become of major influence in steering a sensible course.

Another breed is the collector of bought specimens. How does one classify the increasing numbers of people buying specimens at the Amateur Entomologists' Society exhibition for instance? What of those who go to butterfly farms where they can see live insects or obtain breeding stock and, incongruous though it may seem, buy dead ones. Will these people become conservationists, curio collectors, investment 'stamp' collectors or collectors of wild butterflies? One way or the other there will be a dilution of the numbers of 'the' field entomologist. To counter the dilution, numbers of new people are being drawn into entomology, and voucher collecting, by the BRC schemes. The schemes are *de facto* becoming specialist Societies.

A long-standing traditional Society such as ours would do well to be concious of these developing changes in the entomological scene.

THE NEED FOR HABITAT MANAGEMENT

There are sometimes howls of anguish when the subject of habitat management arises. Often such management seems unnecessary or a positive disaster. It is sometimes not appreciated that most habitats in Britain are artificial and have arisen through past land use practice. There are often circumstances where one has to take direct action to maintain a habitat in ideal condition. Where misunderstandings arise is through decisions being taken in the absence of entomological information. What suits plants may not suit insects. Of course 'wrong' decisions are being made when survey and advice for invertebrates is often lacking. One of the saddest things is that after so many years of the study of butterflies, entomologists have failed to provide the information necessary in order to manage habitats for these insects. Look at the standard books and consult today's specialists and it is astounding how little we really know. Often there are doubts even over preferred foodplants, let alone structural components of vegetation required by larvae and adults. With butterflies and other insects, we have got to start thinking the same thoughts as the people who have to manage sites – if you had to manage this site, what facts would you need and where are the main gaps in knowledge? The more you become involved with conservation, the more you will realise that the simple general knowledge answers are inadequate.

CONCLUSIONS

Discussion has extended through a series of perhaps seemingly disparate themes, but they all lead to what I see as the way forward.

One thing is certain. Increasingly the best pieces of countryside will be those which are under some degree of protection, with inherent controls. Either entomologists adapt constructively to this fact of life, or they face unacceptable frustrations. There is the opportunity to influence which pieces of countryside are protected and how those areas are managed. Insects will not look after themselves, future generations of entomologists being reliant upon this generation making the correct decisions.

The gulf in understanding between entomologists and conservation bodies has got to be bridged. This entails building up trust that entomologists are responsible people, and that requires an effort and diplomacy which has been lacking in the past.

There is also an education job to be done, to convince others that invertebrate conservation does matter. Invertebrates are part and parcel of ecosystems, not an irrelevant separate subject. We must maximise on Butterfly Year and other opportunities to foster direct involvement by the conservation bodies and general public at large.

Entomologists need to demonstrate a constructive approach by helping with surveys, sorting out the ecological requirements of species (including the early stages) and translating their knowledge into practical advice on management and site evaluation. Council has set up a small group, I will not call it a committee, to pursue liaison with various bodies on the question of surveys and permits. MoD have come to the Society for help with surveying off their own bat. We have now to get other organisations similarly enthusiastic about welcoming members of our Society.

The Society's special publications programme is very relevant to increasing the capacity of members to make the best use of their entomological time. The major increase in enthusiasm for microlepidoptera both broadens the taxonomic spread and defuses some of the pressure on the macros. However, as a national society we still have not found a role in relation to recording schemes and their various groups of adherents.

I believe that we find ourselves at something of a cross roads, both as regards conservation and the place of the field entomologist. Conservation is poised at a critical point in relation to the final decisions as to which sites should be saved. If we react constructively now, this will be of immense benefit to the future of the British fauna and to the future image of the field entomologist. If this chance is muffed, then not only will the doors start to close more firmly, but our position will not be established before a new breed of entomologist comes along with much more restrictive ideas. The membership is faced with a time of change. Adapting to such a change and evolving a response is not easy.

This Society is seen as the leading national body for the field entomologist and I believe it has an important role as spokesman for the needs and values inherent in the pursuit and advancement of entomological knowledge. It has been a privilege to serve as President and I look forward to continuing to play an active part on these issues within the Society.

BOOK REVIEW

Hilfsprogramm für Schmetterlinge, by Josef Blab and Otakar Kudrna. 135 pp., 4 photo plates. Kilda-Verlag, D-4402, Greven 1, W. Germany. No price stated.

This book gives an excellent, if alarming, analysis of the present state of the butterfly and burnet moth fauna of West Germany, and of the pressures upon it, which are attributed mainly to intensive agriculture and selective forestry. The 200 indigenous species are grouped and discussed in categories based on their combined biological and ecological requirements, supported by tables of their foodplants. The main causes of decline are examined, with the conclusion that 91 species are more or less seriously threatened. A standard list of species is provided, arranged by genera and showing for each threatened species the intensity of the threat as defined in the German red data book. As practical remedies for the future the emphasis is on nature reserves for the most endangered species; but measures which could be applied to check decline in each type of habitat elsewhere are also listed. There is also an up-to-date bibliography and a glossary of terms.

Despite a somewhat complicated lay-out, the method of analysis used in this book could be applied with advantage in Britain also. The four page summary is given in English translation, and the detail of the main text in German is well worth some struggle with the help of a dictionary.

R.F.B.

APPENDIX – BRITISH TERRESTRIAL AND FRESHWATER FAUNA

ARTHROPODS

INSECTS

OTHER THAN INSECTS

Insecta		Crustacea	
Thysanura	8	Anostraca	2
Diplura	12	Notostraca	1
Protura	17	Cladocera	88
Collembola	304	Ostracoda	77
Orthoptera	30	Copepoda	103
Dermaptera	6	Branchiura	2
Dictyoptera	3	Mysidacea	2
Plecoptera	35	Isopoda	35
Ephemeroptera	46	Amphipoda	17
Odonata	45	Bathynellacea	2
Thysanoptera	159	Decapoda	4
Psocoptera	51	Pauropoda	22
Mallophaga	514	Diplopoda	51
Anopleura	25	Chilopoda	43
Hemiptera	1709	Symphyla	14
Neuroptera	55	Arachnida	
Megaloptera	6	Pseudoscorpiones	27
Mecoptera	4	Araneae	616
Trichoptera	194	Opiliones	22
Lepidoptera	2500	Acari	*2000
Coleoptera	4000	Pentastomida	3
Strepsiptera	16		
Hymenoptera	*6410		3131
Diptera	*6000		
Siphonaptera	57		
	<hr/> 22,437		
		(potential total 4000 +)	

(potential total 24,000 +)

* Groups where hundreds of species may yet be added.

OTHER INVERTEBRATES

OTHER GROUPS

Chordata		VERTEBRATES	
Bryozoa	9	(native breeding species)	
Tardigrada	76		
Annelida		Mammalia	35
Oligochaeta	150	Aves	250
Hirudinea	20	Reptilia	6
Mollusca	199	Amphibia	3
Nematomorpha	4	Pisces	55
Nematoda			
(see Platyhelminths)	*1000		349
Rotifera	550		
Gastrotrichia	11		
Acanthocephala	8		
Platyhelminthes		PLANTS	
Turbellaria (Tricladida 11)	78	(native, excluding micro species)	
Monogenea (freshwater)	36		
Digenea (freshwater)	34	Spermatophyta	2000
Cestodes (freshwater)	27	Pteridophyta	80
Terrestrial parasites	*900	Bryophytes	980
Coelenterata		Lichens	1380
Hydrozoa	7		
Porifera	6		4440
	3115	Fungi	12000
			16440
	(potential total 4000 +)		
Protozoa	15,000 – 20,000	Algae	6000 – 11000

RECORDS OF CURCULIONIDAE (COLEOPTERA) MAINLY FROM WEST CUMBRIA

by R.W.J. READ

43 Holly Terrace, Hensingham, Whitehaven, Cumbria.

INTRODUCTION

A considerable amount of work was done by F.H. Day on the Coleoptera of Cumberland (now Cumbria) but since the publication of his lists (Day, 1912, 1923, 1928, 1933) and in the intervening years little work in general appears to have been done on the beetles of the county, and apart from odd notes etc few lists and reports have appeared in the literature. However a few accounts have been published in fairly recent times, the most noteworthy being those of Angus (1964, 1965) and Davidson (1959, 1961). Both workers collected quite extensively in Cumbria but the latter author worked more of the well known and more frequented sites, areas that were known to Day and his co-workers.

During the past fifteen years I have developed an interest in the Curculionidae (*sensu stricto*) and I have collected over a comparatively large area of the county and visited as many sites as possible. In particular I have worked the western and to some extent the southern coastal region of Cumbria, an area which was to some extent neglected by Day and his contemporaries.

The following records of Curculionidae are all based on personal collecting and all the specimens taken are in my collection. In order to save space much of the data for each species has been kept to a minimum. The methods of collecting have been almost entirely omitted and nearly all specimens have been taken by traditional techniques of sweeping, beating, grubbing and leaf litter extraction. The dates of capture have been summarised to months only, i.e. I, II, III etc., as individual days and years were thought to have no real significance. In most cases the recognized foodplants of the adult weevils have been specifically worked and where an associated foodplant is listed this is indicated by the abbreviation (AFP) immediately following the name. Much of the information regarding host-plants has been taken from Dieckmann (1972, 1980), Hoffman (1950, 1954, 1958) and Scherf (1964).

Contained within the West Cumbria region are many varied and interesting habitats. They range from mountains, acid bogs and moorland, lakes and tarns to the rivers, wet meadows and peat mosses of the lowlands. There are areas of martime cliffs and extensive sand dunes and also river estuaries with saltmarsh. Apart from the coniferous woods in the area there is also fine broad-leaved woodland. Many of these woods are of ancient origin and contain a variety of tree species.

An attempt has been made in this list to indicate the habitat in which a particular species was found and a broad habitat classification is given below. It must be stressed that this is only a very basic outline and I have tried to cover as many logical habitat 'types' as possible. The appropriate abbreviation is given for each habitat category and in some cases subdivisions have been necessary. 1. Woodland: (d)-deciduous, (c)-coniferous. 2. Scrub. 3. Grassland, (general). 4. Heath. 5. River banks: (a) and (b) streams. 6. Hedgerows and verges, (f)-field, (r)-roadsides. 7. Waste ground, railway embankments and quarries. 8. Open areas: (c)-cliffs, (m)-mountains, (d)-sand dunes (including general arenaceous habitats), (s)-salt marsh. 9. Marshes and bogs (freshwater). 10. General cultivated areas including gardens.

In keeping with the various national biological recording schemes I have concentrated on collecting in as many 10 kilometre squares as possible and the

localities for each species in the list have been arranged by the 10km squares of the national grid. Individual grid references are given to one kilometre square and all the co-ordinates have been taken from the ordnance survey 1:25 000 first series maps. An outline map of Cumbria showing the area covered together with all the relevant 10km squares is shown in figure 1.

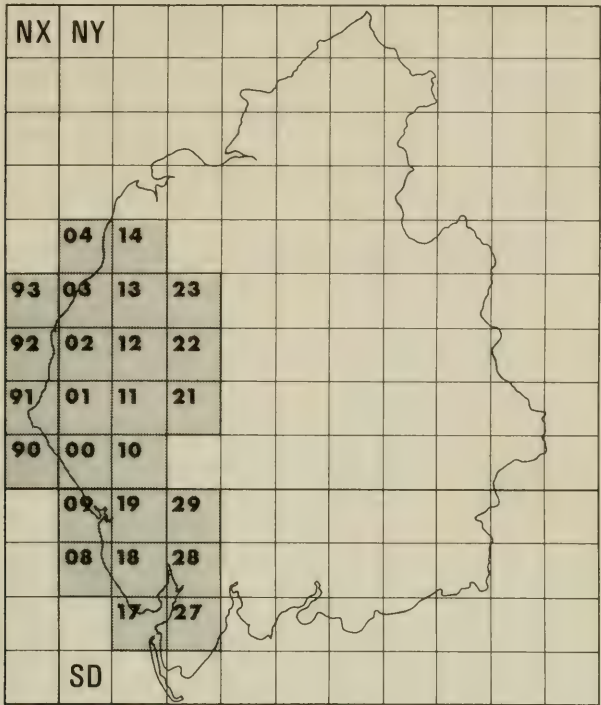


Fig. 1 Outline map of Cumbria showing the area covered and all the individual 10km squares.

In the course of collecting over the years I have managed to add 21 new species of Curculionidae to Cumbria and vice county 70 Cumberland. Some interesting species have turned up and the most noteworthy in recent years was the discovery in West Cumbria of *Furcipes rectirostris* Linnaeus, a weevil new to Britain, (Read, 1981a). All the new county records have been published elsewhere in the literature, (Read, 1970, 1975, 1976, 1977, 1978a, 1978b, 1979, 1980a, 1980b, 1981b).

The nomenclature in the following list is according to Kloet & Hincks (1977).

Otiorhynchus Germar, 1824

Otiorhynchus atroapterus (Deg.). Sellafield station, NY02/02 (8d). Ravenglass Reserve, SD05/97 (8d). Haverigg, SD13/78 (8d). Dunnerholme, SD21&79 (8d). Sandscale Haws, SD20/75 (8d). iv,v,vi. *Ammophila arenaria*, (AFP), *Lotus corniculatus*.

O. desertus Rosenhauer. South Head, St. Bees, NX95/12 (8c). iv,ix. *Armeria maritima*, *Plantago maritima*.

O. ligneus (Olivier). Nethertown, NX98/07 (8c). Fleswick Bay, NX94/13 (8c). St. Bees, NX96/11 (8c). Whitehaven, NX96/18 (8c). Harrington, NX98/24 (8c). Seascale, NY04/00 (8d). Hyton marsh, SD07/88 (8c). Hodbarrow Point, SD18/78 (8d). Askam, SD21/79 (8d). iii-viii,x. *Armeria maritima*, *Hypochoeris radicata*, *Lotus corniculatus*, *Plantago lanceolata*, *P. maritima*, *Rumex acetosella*.

O. nodosus (Müller). Sillathwaite, NY06/12 (8m). Black Combe, SD13/84 (8m). iv,v. *Calluna vulgaris*, *Vaccinium myrtillus*.

O. ovatus (L.). Braystones, NX99/06 (8d). St. Bees, NX94/13 (8c). Harrington, NX98/24 (8d). Sellafeld Station, NY02/02 (8d). Seascale, NY05/01 (8d). Allonby, NY07/41 (8d). Drigg, SD04/98 (8d). Ravenglass Reserve, SD07/95 (8d). Eskmeals Reserve, SD08/94 (8d). Haverigg, SD13/79 (8d). Sandscale Haws, SD19/75 (8d). Hodbarrow Point, SD18/78 (8d). Silecroft, SD11/82 (8d). Kirksanton, SD13/80 (3). Dunnerholme, SD21/79 (7). ii,iv-x. *Bellis perennis*, *Hypochoeris radicata*, *Matricaria maritima*, *Ononis repens*, *Plantago coronopus*, *P. lanceolata*, *P. maritima*, *Taraxacum officinale*, *Thymus praecox*, *Rumex acetosella*, *Senecio jacobaea*.

O. porcatus (Herbst). Hensingham, NX98/16 (10). iv,v,viii-x. *Bellis perennis*, *Convallaria majalis*, *Polyanthus* sp. *Primula* sp. (AFP), *Ranunculus repens*, *Scrophularia nodosa*.

O. rugifrons (Gyll.). St. Bees, NX95/11 (8c). Harrington, NX98/24 (8d). Braystones, NY00/05 (8d). Ravenglass, SD08/94 (7). Hodbarrow Point, SD18/78 (8d). Askam in Furness, SD20/77 (7). iv-vi,ix,x. *Lotus corniculatus*, *Plantago coronopus*, *P. lanceolata*, *P. maritima*.

O. rugostriatus (Goeze). Ravenglass, SD08/94 (7). *Lotus corniculatus*. iv,v.

O. singularis (L.) Nethertown, NX98/08 (7). St. Bees, NX95/11 (8c). Sandwith, NX96/13 (6r). Harris Moor, NX99/18 (2). Beckermeth, NY01/05 (7). Carleton Moor Woods, Haile, NY02/09 (1d). Calder Bridge, NY04/06 (6f). Addyhouse Wood, Hallsenna Moor, NY06/00 (1d). Gosforth, NY06/03 (6r). Holmrook, NY08/00 (6f). Egremont, NY02/10 (6r). Sillathwaite, NY06/12 (1c). Gilgarran, Distington, NY02/23 (6r). Maryport, NY04/37 (7). Parkgate Tarn, NY11/00 (1d). Birks Wood, Strands, NY11/03 (1d). Silvercove Beck, Ennerdale, NY13/13 (5b). Holme Wood, Loweswater, NY11/21 (1d). River Derwent, Cockermouth, NY12/31 (5a). Aspatria, NY15/42 (1c). Keskadale, NY20/19 (1d). Hyton Marsh, Bootle, SD07/88 (8c). Bootle, SD08/89 (6r). Newtown Knott, Ravenglass, SD09/95 (1c). Barfield Tarn, Whitbeck, SD10/86 (6f). Greenroad Station, SD19/84 (6f). Corney, SD11/91 (6r). Rainsbarrow Wood, Ulpha, SD19/93 (1d). iv-xii. *Armeria maritima*, *Betula verrucosa*, *Calluna vulgaris*, *Corylus avellana*, *Crataegus monogyna*, *Fagus sylvatica*, *Hedera helix*, *Lotus corniculatus*, *Silene dioica*, *Plantago coronopus*, *P. lanceolata*, *Prunus spinosa*, *Quercus* sp. *Rumex acetosella*, *P. obtusifolius*, *Salix atrocinerea*, *Sorbus aucuparia*, *Urtica dioica*, *Ulex europaeus*.

O. sulcatus (F.) Braystones, NX99/00 (8d). Whitehaven, NX95/15 (8c). Hensingham, NX98/16 (10). Parton, NX98/21 (7). Beckermeth, NY03/01 (8d). Gosforth, NY08/04 (5d). Distington, NY00/22 (10). Dunnerholme, SD21/79 (7). iv-xii, *Azalea* sp., (AFP), *Corylus avellana*, *Geranium molle*, *Polyanthus* sp., *Primula* sp., *Ranunculus repens*, *Rumex obtusifolius*.

Caenopsis Bach, 1854

Caenopsis fissirostris (Walton). Parkbreast Coppice, NY11/00 (1d). Kid Beck, Strands, NY11/04 (1d). Birks Wood, NY12/04 (1d). Ennerdale, NY12/13 (1d). iv,viii,ix-xi. (Specimens extracted mainly from oak leaf litter and moss.)

C. waltoni (Boheman). Braystones NX99/06 (8c). St. Bees, NX95/11 (8c). Fleswick, NX94/13 (8c). Holmrook, NY08/00 (6r). iv,vi-x. *Hypochoeris radicata*, *Plantago lanceolata*, *P. maritima*, *Rumex acetosella*, *Thymus drucei*.

Trachyphloeus Germar, 1817

Trachyphloeus aristatus (Gyll.). Braystones, NX99/06 (8c). Fleswick Bay, NX94/13 (8c). iv,viii,x. *Plantago coronopus*, *P. lanceolata*, *Rumex acetosella*.

T. bifoveolatus (Beck). Coulderton, NX97/09 (8c). Braystones, NX99/06 (8c). St. Bees, NX95/11 (8c). Fleswick Bay, NX94/13 (8c). Whitehaven, NX96/16 (8c). Harrington, NX98/24 (8d). River Ehen, NY00/05 (8d). Seascale, NY04/03 (8d). Dunnerholme, SD21/79 (7). iv,vi,viii-x. *Hypochoeris radicata*, *Geranium molle*, *Lotus corniculatus*, *Plantago coronopus*, *P. lanceolata*, *P. maritima*, *Rumex acetosella*.

T. laticollis Boheman. Coulderton, NX97/09 (8c). Nethertown, NX98/07 (8c). Braystones, NX99/06 (8c). St. Bees, NX95/11 (8c). iv,vi,viii-x. *Hypochoeris radicata*, *Plantago coronopus*, *P. lanceolata*, *Rumex obtusifolius*.

Phyllobius Germar, 1824

Phyllobius argentatus (L.). Bigrigg, NX98/13 (1c). Nursery Wood, Beckermeth, NY02/06 (1d). Hallsenna Moor, NY06/00 (2). Holmrook, NY08/00 (5a). Blengdale, NY08/05 (6r). Kirkland, NY07/17 (6r). Cogra Moss, NY09/19 (2). Parkgate Tarn, NY11/01 (1d). Ennerdale Water, NY12/14 (1d). Loweswater, NY11/22 (1d). Eskmeals Reserve, SD08/94 (8d). Muncaster, SD11/98 (1d). v-viii. *Betula* sp. (AFP), *Corylus avellana*, *Fagus sylvatica*, (AFP), *Prunus padus*, *Salix* sp. (AFP), *Quercus* sp.

P. calcaratus (F.). Whitehaven, NX96/13 (6r). Carletonmoor Woods, NY02/19 (1d). Seascale, NY05/03 (6r). Calderbridge, NY05/06 (1d). Hallsenna Moor, NY06/00 (1d). Egremont, NY02/10 (1d). Distington, NY02/23 (6r). Parkgate Tarn, NY11/01 (1d). Strands, NY11/03 (1d). Loweswater, NY11/12 (1d). Drigg, SD07/98 (5a). Ravenglass, SD09/97 (1d). Millom, SD19/83 (6r). Arnaby Moss, SD19/84 (2). Muncaster, SD12/98 (1d). v,vi,vii. *Acer* sp. (AFP), *Alnus*, (AFP), *Corylus avellana*, (AFP), *Fagus sylvatica* *Quercus* sp., *Salix atrocinerea*, *Sorbus aucuparia* (AFP).

P. maculicornis Germar. Beckermeth, NY01/06 (7). Hallsenna Moor, NY06/00 (2). Seascale, NY05/03 (6f). Holmrook, NY08/00 (6f). Egremont, NY01/10 (6r). Strands, NY11/03 (1d). v,vi,vii. *Alnus* sp. (AFP), *Betula* sp., (AFP), *Corylus avellana*, *Crataegus monogyna*, *Prunus padus*, *Rubus* sp.

P. oblongus (L.). Whitehaven, NX96/13 (6r). Hensingham, NX99/17 (5b). Calder Hall, NY03/03 (6f). Gosforth, NY08/04 (6r). Frizington, NY02/17 (6r). Egremont, NY02/10 (6r). Kirkland, NY07/17 (6r). Strands, NY11/03 (1d). Loweswater, NY11/22 (6r). Silcroft, SD13/82 (6f). Muncaster, SD11/98 (6f). Hodbarrow Point, SD18/78 (7). v,vi,viii. *Acer* sp., (AFP), *Corylus avellana*, *Crataegus monogyna* (AFP), *Fagus sylvatica*, *Prunus spinosa* (AFP), *Salix* sp., (AFP).

P. pomaceus Gyll. Sandwith, NX96/13 (6r). Church Moss, NY01/05 (7). River Bleng, NY09/03 (6a). Frizington, NY01/16 (6r). Loweswater, NY11/22 (1d). Drigg, SD07/98 (6f). v,vi. *Urtica dioica* (AFP), *Prunus spinosa*.

P. pyri (L.). St. Bees, NX96/13 (6r). Bigrigg, NY98/12 (1c). Hensingham, NX98/16 (10). Church Moss, NY01/05 (9). Ponsonby, NY03/04 (6f). Haile, NY03/09 (1d). Seascale, NY05/03 (6f). Calderbridge, NY05/06 (5a). Hallsenna Moor, NY06/00 (6f). Holmrook, NY08/00 (6r). Frizington, NY00/16 (6r). Egremont, NY02/10 (6r). Kirkland, NY07/17 (7). Parkgate Tarn, NY11/01 (1d). Strands, NY11/03 (1d). Loweswater, NY11/21 (1d). River Irt, SD07/98 (5a). Ravenglass, SD09/97 (1d). Sandscale Haws, SD19/75 (8d). Silcroft, SD13/82 (6r). Arnaby Moss, SD19/84 (2). Muncaster, SD11/97 (1d). Dunnerholme, SD21/79 (7). iv-vii. *Betula* sp. (AFP), *Acer pseudoplatanus*, *Ulmus* sp., *Quercus* sp. (AFP), *Sorbus aucuparia*, (AFP), *Crataegus monogyna* (AFP), *Corylus avellana*, *Prunus spinosa*, *Salix* sp. (AFP), *Rosa* sp. (AFP), *Ulex europaeus*, *Fagus sylvatica*.

P. roboretanus Gredler. Saltom Bay, NX96/15 (7). Sandwith, NX96/13 (6r). Whitehaven, NX96/18 (8c). Bigrigg, NY98/13 (6r). Hensingham, NX98/17 (5b). Moresby, NX99/18 (5b). Beckermest, NY01/05 (7). Calder Hall, NY03/03 (6r). Haile, NY02/09 (6f). Seascale, NY05/03 (6r). Egremont, NY01/10 (6r). Bogholes Wood, NY00/18 (6r). Cogra Moss, NY09/19 (2). Nr. Moresby, NY00/21 (6r). Gilgarran, NY02/23 (6r). Ravenglass, SD08/96 (7). Whinnyhill Coppice, SD09/99 (6r). Silecroft, SD13/81 (6f). Murthwaite Green, SD13/82 (6r). Greenroad, SD19/84 (6r). Millom Marsh, SD18/80 (6f). v-viii. *Trifolium repens*, *Prunus spinosa* (AFP), *Acer* sp. (AFP), *Crataegus* sp. (AFP), *Salix* sp. (AFP), *Vicia* sp. (AFP), *Rubus* (AFP), *Urtica dioica*, *Corylus* (AFP), *Rosa* sp. (AFP), *Lathyrus* sp.

P. viridiaeris (Laicharting). Nr. Starling Castle, NY01/05 (7). Aspatria, NY15/42 (1c). Saltcoats, SD07/96 (8s). River Irt, SD07/98 (6a). Gutterby Banks, SD10/83 (8c). Silecroft, SD13/82 (6f). Millom, SD17/81 (6f). v-viii. *Achillea millefolium*, (AFP), *Crataegus* (AFP), *Armeria maritima*, *Rubus* sp. *Rumex acetosella*.

P. viridicollis (F.). Sandwith, NX96/14 (6r). River Ehen, NY00/04 (7). Nr. Keekle, NY00/16 (7). Kirkland, NY07/17 (6r). Nr. Lamplugh, NY09/21 (6r). Nr. Clints Quarry, NY00/12 (7). *Vicia sepium* (AFP), *Fagus sylvatica*. v,vi.

Polydrusus Germar, 1817

Polydrusus cervinus (L.). Carletonmoor Woods, NY02/09 (1d). Hallsenna Moor, NY06/00 (2). Blengdale, Gosforth, NY08/05 (1c). Parkgate Tarn, NY11/00 (1d). Foxfield Wood, NY10/03 (1d). Ennerdale, NY12/13 (1c). Ravenglass, SD08/96 (1d). Muncaster, SD11/97 (1d). iv-vi. *Betula* sp. (AFP), *Crataegus monogyna*, (AFP), *Salix* sp. (AFP), *Sorbus aucuparia*, *Ulex europaeus*.

P. chrysomela (Olivier). Drigg, SD06/97 (8s). Saltcoats, SD07/96 (8s). River Esk, SD10/95 (8s). vi-viii. *Aster tripolium*, *Halimione portulacoides*, *Plantago maritima* (AFP).

P. mollis (Ström). Low Wood, Ulpha, SD20/94 (1d). vi. *Betula* sp. *Corylus avellana* (AFP).

P. pterygomalis Boheman. Bigrigg, NY98/13 (6r). Hensingham, NX98/17 (7). Moresby, NX99/18 (6r). Beckermest, NY01/05 (7). Calderbridge, NY04/06 (6r). Hallsenna Moor, NY06/00 (2). Gosforth, NY09/04 (1d). Keekle, NY00/16 (10). Kirkland, NY07/17 (6r). Distington, NY02/23 (6r). Parkgate Tarn, NY11/00 (1d). Strands, NY10/03 (1d). Lamplugh, NY10/22 (6r). Cockermouth, NY12/31 (5a). Drigg, SD07/98 (5a). Muncaster, SD09/97 (1d). Silecroft, SD13/82 (6f). Kirksanton Moss, SD13/80 (6f). Arnaby Moss, SD19/84 (2). Barrel Bank, SD10/95 (1d). Low Wood, Ulpha, SD20/94 (1d). v-viii. *Betula* sp. (AFP), *Crataegus monogyna*, *Corylus* (AFP), *Fagus* (AFP), *Quercus*, sp. (AFP), *Salix* sp. (AFP).

P. undatus (F.). Parkgate Tarn, NY11/00 (1d). Foxfield Wood, NY10/03 (1d). Keskadale Wood, NY20/19 (1d). Arnaby, SD18/85 (1d). Muncaster Fell, SD11/98 (1d). v,vi. *Betula* sp. (AFP), *Corylus* (AFP), *Quercus* sp. (AFP).

Barypeithes Jacquelin du Val, 1855

Barypeithes araneiformis (Schrank). Hensingham, NX98/17 (7). Clints Quarry, Egremont, NY00/12 (7). Dean Moor, NY06/23 (1d). Ravenglass, SD09/97 (1c). iv-vii. *Crataegus monogyna*, *Hedera helix* (AFP).

B. pellucidus (Boheman). Whitehaven, NX96/18 (8c). Moss Wood, NX99/18 (1c). Parton, NX98/20 (6r). Nursery Wood, NY02/06 (1d). Seascale, NY05/03 (6f). Holmrook, NY08/00 (5a). Frizington, NY00/16 (6r). Distington, NY00/22(10). Greengate Wood, NY11/02 (1d). Cockermouth, NY12/31 (1d). Annaside, SD08/87 (6f). Drigg, SD07/98 (7). Silecroft, SD13/81 (10). v-vii. *Crataegus monogyna*, *Hedera helix* (AFP).

B. sulcifrons (Boheman). Silecroft, SD11/82 (8d). Kirksanton Haws, SD13/79 (6f). iv,vi. *Polygonum* sp.

Sciaphilus Schoenherr, 1823

Sciaphilus asperatus (Bonsdorff). Hensingham, NX99/17 (6r). Seascale, NY03/02 (1c). Gosforth, NY06/00 (6f). Clints Quarry, Egremont, NY00/12 (7). Egremont, NY02/10 (6r). Keekle, NY00/16 (6r). Distington, NY02/23 (6r). Strands, NY10/04 (1d). Drigg, SD07/98 (6r). Ravenglass, SD09/94 (6f). iv-ix, xi. *Corylus avellana*, *Crataegus monogyna*, *Heracleum sphondylium*, *Prunus spinosa*, *Quercus* sp., *Rubus* sp. (AFP). *Salix* sp. *Trifolium campestre*, *Ulex europaeus*, *Urtica dioica*, *Vicia sepium*.

Brachysomus Schoenherr, 1823

Brachysomus echinatus (Bonsdorff). Fleswick Bay, NX94/13 (8c). iv. *Prunus spinosa*.

Strophosomus Schoenherr, 1823

Strophosomus capitatus (Deg.). River Irt, Holmrook, NY08/00 (5a). Horseclose Wood, NY11/00 (1d). Strands, NY11/04 (1d). v,vi,x. *Betula* sp, *Corylus avellana*, (AFP), *Crataegus monogyna*.

S. melanogrammus (Forster). Braystones NX99/06 (8c). St. Bees, NX95/11 (8c). Fleswick, NX94/13 (8c). Sandwith, NX95/15 (6r). Seascale, NY03/01 (6f). River Calder, NY03/04 (5a). Nursery Wood, Beckermest, NY02/06 (1d). Calderbridge, NY05/06 (1d). Hallsenna Moor, NY06/00 (1d). Gosforth, NY06/04 (1d). Cogra Moss, NY09/18 (1c). Maryport, NY14/01 (1d). Ennerdale Water, NY10/15 (1c). Loweswater, NY15/22 (6r). Cockermouth, NY12/32 (1c). Keskadale, NY20/19 (1d). Drigg, SD04/99 (8d). Ravenglass SD09/95 (1d). Sandscale Haws, SD19/75 (8d). Silecroft, SD11/82 (8d). Arnaby Moss, SD19/84 (1d). Corney, SD11/91 (1d). Muncaster, SD12/97 (5a). Rainsbarrow Wood, SD19/93 (1d). Dunnerholme, SD21/79 (7). ii,iv-xii. *Calluna vulgaris*, *Corylus avellana*, *Crataegus monogyna*, *Betula* sp., *Fagus sylvatica*, *Plantago lanceolata*, *P. maritima*, *Potentilla erecta*, *Prunus spinosa*, *Quercus* sp., *Rumex acetosella*, *R. crispus*, *Salix* sp., *Cystisus scoparius*, *Sorbus aucuparia*, *Ulex europaeus*.

S. nebulosus Stephens. Hyton Marsh, Bootle, SD07/88 (8d). Ravenglass, SD09/95 (2). Walkhole Bank, Silecroft, SD11/82 (8d). Holey Beck, Whitbeck, SD11/86 (3). Hodbarrow Point, SD18/78 (8d). Dunnerholme, SD21/79 (7). iv,v,vii,viii. *Calluna vulgaris*, (ARP), *Plantago lanceolata*, *Prunus spinosa*, *Ulex europaeus*, *Thymus drucei*.

S. sus Stephens. Hallsenna Moor, NY06/00 (2). Cogra Moss, NY09/18 (1c). Comb Gill, NY10/18 (m). v,vi,viii. *Calluna vulgaris*, (AFP).

Cneorhinus Schoenherr, 1823

Cneorhinus plumbeus (Marsham). St. Bees, NX97/10 (7). Taken by general grubbing.

Philopedon Stephens, 1831

Philopedon plagiatus (Schaller). Braystones, NX99/06 (8d). Church Moss, NY01/05 (8d). Sellafield, NY02/02 (8d). Hallsenna Moor, NY06/00 (8d). Irtton, NY09/00 (8d). Maryport, NY02/35 (8c). Ravenglass Reserve, SD05/97 (8d). Eskmeals Reserve, SD08/94 (8d). Kirksanton Haws, SD13/79 (8d). Townend Bank, SD10/83 (8d). Dunnerholme, SD21/79 (8d). Sandscale Haws, SD19/75 (8d). iv-viii. *Ammophila arenaria* (AFP), *Anthyllis vulneraria*, *Cirsium arvense*, *Erodium cicutarium*, *Lotus corniculatus*, *Plantago lanceolata*, *Rumex maritimus*, *Thymus drucei*.

Liophloeus Germar, 1817

Liophloeus tessulatus (Müller). Sandwith, NX96/13 (6r). Hensingham, NX98/16 (6r). Calder Hall, NY03/04 (6f). Hallsenna Moor, NY06/00 (6f). Weddicar, NY00/16 (6r). Gilgarran, NY02/23 (6r). Ravenglass, SD08/96 (6r). Drigg, SD08/97 (6r). Duddon Hall, SD19/89 (6r). Duddon Mount, Millom, SD18/82 (6f). v,vi. *Heracleum sphondylium*, (AFP).

Barynotus Germar, 1817

Barynotus moerens (F.). Mirehouse, NX97/16 (10). Hensingham, NX98/16 (10). Cat Gill, Harrington, NX98/23 (6c). Weddicar, NY01/16 (6r). Dubbs Moss, NY10/29 (2). Drigg, SD07/98 (6f). Ravenglass, SD08/94 (1c). iii,vi,viii,ix. *Mercurialis perennis*, (AFP), *Plantago lanceolata*, *Ranunculus repens*.

B. obscurus (F.). Braystones, NX99/06 (3). Rottington, NX96/13 (6r). Hensingham, NX98/16 (10). Weddicar, NY00/16 (6r). Moresby, NY00/18 (6r). Distington, NY00/23 (6r). Maryport, NY04/38 (8c). Clints Quarry, NY00/12 (7). Muncaster, SD12/97 (5a). iv-vii,ix. *Heracleum sphondylium*, *Plantago lanceolata*, *Rumex obtusifolius*, *Ranunculus repens*, *Silene dioica*, *Trifolium* sp., (AFP).

B. squamosus Germar. St. Bees, NX95/11 (8c). Fleswick, NX94/13 (8c). Braystones, NY00/05 (8d). Nr. Hallsenna Moor, NY06/00 (6f). Cockermouth, NY12/31 (5a). Ravenglass, SD08/94 (8s). Millom, SD18/85 (3). iv,v,vii,ix,x. *Plantago lanceolata*, *Ranunculus repens*, *Rubus* sp., *Rumex acetosella*.

Tropiphorus Schoenherr, 1842

Tropiphorus terricola (Newman). Gosforth, NY07/03 (10). River Irt, NY10/04 (5a). Dubbs Moss, NY10/29 (2). Drigg, SD07/98 (6f). Saltcoats, SD07/97 (6r). Townend Bank, SD10/83 (8d). Ravenglass, SD08/95 (3). iv-vii. *Achillea millefolium*, *Corylus avellana*, *Plantago lanceolata*, *Matricaria maritima*, *Rosa* sp., *Urtica dioica*.

Sitona Germar, 1817

Sitona ambiguus Gyll. St. Bees Head, NX94/15 (8c). Nr. Sandwith, NX96/14 (6r). Hensingham, NX99/15 (6r). Nr. Bigrigg, NX98/12 (6r). Nr. Parton, NX98/20 (6r). Harrington, NX98/23 (8c). Beckermeth, NY01/05 (7). Seascale, NY03/01 (7). Haile, NY02/09 (6f). Egremont, NY01/10 (6r). Clints Quarry, NY00/12 (7). Dub Bridge, Weddicar, NY00/16 (6r). Moss Dalts, NY02/11 (6r). Nr. Kirkland, NY07/17 (6f). Gilgarran, Distington, NY02/23 (6r). Whitelees Wood, Aspatria, NY17/41 (1d). Ravenglass, SD07/97 (6r). Drigg, SD07/98 (6r). Moss Lane, SD13/80 (6f). Nr. Greenroad Station, SD18/83 (6r). iv-x. *Vicia sepium*, (AFP), *Lathyrus pratensis*, (AFP).

S. cambricus Stephens. Seascale, NY04/00 (8d). Gosforth, NY08/04 (9). Drigg, SD07/97 (8d). Silecroft, SD13/81 (6f). Kirksanton Moss, SD13/80 (9). Muncaster, SD11/97 (6r). iv-viii. *Lotus corniculatus*, (AFP), *Stachys palustris*.

S. griseus (F.). Seascale, NY02/02 (8d). Braystones, NY00/04 (8d). Drigg, SD04/99 (8d). Ravenglass Reserve, SD06/96 (8d). Eskmeals Reserve, SD08/95 (8d). Haverigg, SD13/78 (8d). Sandscale Haws, SD19/75 (8d). iv-viii. *Lotus corniculatus*, (AFP), *Ononis repens*, *Taraxacum officinale*, *Thymus drucei*.

S. hispidulus (F.). Fleswick Bay, NX94/13 (8c). St. Bees, NX96/11 (8c). Hensingham, NX98/17 (10). Harrington, NX98/24 (8c). Braystones, NY00/06 (8c). Hallsenna, NY06/01 (2). Haile, NY03/10 (1d). Kirkland, NY08/19 (3). Strands, NY11/03 (1d). Drigg, SD04/98 (8d). Coteley Bank, SD11/81 (8c). Muncaster, SD12/97 (5a). iv-x. *Lotus corniculatus*, *Trifolium pratense*, *T. repens*, (AFP).

S. humeralis Stephens. Clints Quarry, Egremont, NY00/12 (7). iv,v,ix. *Trifolium campestre*, (AFP).

S. lepidus Gyll. Fleswick, NY94/13 (8c). Whitehaven, NX97/18 (10). Hensingham, NX98/17 (7). Harrington, NX98/24 (8c). Beckermest, NY01/05 (7). Braystones, NY00/06 (3). Ponsonby, NY03/03 (6r). Seascale, NY04/00 (8d). Gosforth, NY08/02 (6f). Clints Quarry, NY00/12 (7). Weddicar, NY00/16 (6r). Haile, NY03/10 (6f). Distington, NY00/22 (10). Maryport, NY03/37 (7). Parkgate Tarn, NY11/00 (1d). Strands, NY11/03 (3). Ravenglass, SD07/97 (6f). Drigg, SD07/98 (6f). Silecroft, SD13/79 (8d). Whitbeck, SD11/86 (6r). Muncaster, SD10/98 (3). Dunnerholme, SD21/79 (7). iii-x. *Trifolium pratense*, (AFP), *T. repens*, (AFP), *Lotus corniculatus*.

S. lineatus (L.). Hensingham, NX99/17 (6r). Whitehaven, NX98/19 (10). Beckermest, NY01/05 (7). Seascale, NY06/03 (6r). Distington, NY00/22 (10). Saltcoats, SD07/97 (6f). Drigg, SD07/98 (6r). Ravenglass, SD09/95 (3). Silecroft, SD13/82 (6r). Millom, SD19/83 (6r). iv-ix. *Laburnum* sp., (AFP), *Vicia sepium* (AFP).

S. lineellus (Bonsdorff). Nethertown, NX97/09 (7). Barrowmouth, NX95/16 (8c). Whitehaven, NX96/18 (8c). Seascale, NY04/00 (8d). Nr. Braystones, NY00/05 (8c). Clints Quarry, NY00/12 (7). Nr. Maryport, NY02/35 (8d). Annaside Bank, SD09/84 (8c). Selker Bay, SD07/88 (8c). Ravenglass, SD08/95 (8d). Haverigg, SD13/78 (8d). Sandscale Haws, SD19/75 (8d). Hodbarrow Point, SD18/78 (7). Silecroft, SD12/80 (8d). iii-ix, *Lotus corniculatus*, (AFP).

S. regensteiniensis (Herbst). Braystones, NX99/06 (6r). Fleswick Bay, NX94/13 (8c). St. Bees, NX97/10 (8c). Harrington, NX98/24 (8c). Beckermest, NY01/05 (7). Seascale, NY02/02 (7). Haile, NY02/08 (5b). Calderbridge, NY05/07 (6f). Hallsenna Moor, NY06/01 (2). Gosforth, NY08/02 (5a). Egremont, NY02/10 (6r). Kirkland, NY08/18 (7). Maryport, NY03/37 (7). Parkgate Tarn, NY11/00 (1c). Horseclose Wood, NY12/31 (5a). Hyton Marsh, Bootle, SD07/88 (8c). Annaside Bank, SD09/85 (6f). Drigg, SD04/99 (10). Eskmeals, SD08/91 (6f). Ravenglass, SD09/97 (2). Haverigg, SD13/79 (8d). Walkhole Bank, SD11/82 (8d). Blackcombe, SD13/83 (8m). Cropple How, SD12/97 (5a). Dunnerholme, SD21/79. iii-ix, xii. *Cytisus scoparius*, (AFP), *Ulex europaeus*, (AFP).

S. striatellus Gyll. Braystones, NX99/06 (9). Fleswick, NX94/13 (8c). Hensingham, NX98/16 (7). Cat Gill, Harrington, NX98/23 (8c). Sellafeld, NY01/03 (5a). Beckermest, NY01/06 (3). Haile, NY03/07 (3). Frizington, NY02/17 (6r). Egremont, NY02/10 (6r). Croasdale Beck, NY08/16 (5b). Harris Side, Kirkland, NY08/18 (7). Dean Moor, NY06/23 (1d). Parkgate Tarn, NY11/00 (1d). Boot, Eskdale, NY17/01 (5b). Comb Gill, NY10/18 (8m). Horseclose Wood, Cockermouth, NY12/31 (1d). Hyton Marsh, SD07/88 (8c). Ravenglass, SD08/95 (8d). Haverigg, SD13/79 (8d). Walkhole Bank, Silecroft, SD11/82 (8d). Barfield Tarn, SD10/87 (9). Chapel Hill, Muncaster, SD10/97 (6f). Cropple How, Muncaster, SD12/97 (5a). Askam, SD21/78 (8d). iii-viii, xii. *Cytisus scoparius*, *Ulex europaeus*, (AFP).

S. sulcifrons (Thunberg). Silver Tarn, Braystones, NX99/06 (9). Whitehaven, NX96/18 (8c). Hensingham, NX98/17 (7). Seascale, NY03/00 (8d). Clints Quarry Egremont, NY00/12 (7). Ravenglass, SD08/95 (5a). Townend Bank, Whitbeck, SD10/83 (8d). iv-viii, x. *Lotus corniculatus*, *Trifolium pratense*, (AFP).

S. suturalis Stephens. Whithaven, NX96/13 (6r). St. Bees, NX98/12 (6r). Hensingham, NX99/17 (6r). Harris Moor, NX99/18 (9). Harrington, NX98/24 (7). Beckermest, NY01/05 (7). Seascale, NY03/03 (6r). Nr. Frizington, NY01/16 (6r). Egremont, NY01/10 (6r). Kirkland, NY07/17 (6r). Distington, NY02/23 (6r). Maryport, NY03/37 (5b). Gaterigghow Bridge, NY10/04 (5a). Cockermouth, NY12/31 (6f). Bootle, SD08/89 (6f). Drigg, SD07/97 (6r). Ravenglass, SD08/95 (8d). Whitbeck, SD11/86 (6r). Silecroft, SD13/80 (6r). Millom, SD18/83 (6r). Dunnerholme, SD20/76 (7). iv-x. *Vicia cracca*, *V. sepium*, (AFP), *Lathyrus pratensis*.

Cleonus Schoenherr, 1826

Cleonus piger (Scop.). Drigg, SD04/98 (8d). Eskmeals Reserve, SD08/94 (8d). Ravenglass Reserve, SD06/96 (8d). v, viii. *Cirsium arvense*, (AFP).

Hypera Germar, 1817

Hypera arator (L.). Church Moss, Beckermert, NY01/05 (6f). Clints Quarry, NY00/12 (7). Lamplugh, NY09/22 (6r). Drigg, SD04/99 (8d). Ravenglass, SD09/95 (8d). Kirksanton Moss, SD13/80 (9). Whitbeck, SD11/83 (6f). v-viii. *Spergula arvensis*, (AFP).

H. dauci (Olivier). Esmeals Reserve, SD08/94 (8d). iv, viii. *Erodium cicutarium*, (AFP).

H. nigrirostris (F.). Braystones, NX99/06 (9). Rottington, NX96/13 (6r). Whitehaven, NX96/18 (8c). Beckermert, NY01/06 (7). Seascale, NY04/00 (8d). Eskmeals Reserve, SD07/95 (8d). Whitbeck, SD11/83 (3). Arrow Moss, SD13/81 (9). v-viii. *Trifolium pratense*, (AFP). *Ononis repens*.

H. plantaginis (Deg.). Braystones, NX99/06 (9). Nethertown, NX98/08 (8c). St. Bees, NX97/10 (7). Whitehaven, NX96/16 (8c). Harrington, NX98/24 (8d). Church Moss, Beckermert, NY01/05 (7). Gosforth, NY09/04 (1c). Clints Quarry, NY00/12 (7). Sandscale Haws, SD19/75 (8d). Kirksanton Moss, SD13/80 (9). Dunnerholme, SD21/79 (7). iv-viii. *Lotus corniculatus* (AFP), *Plantago lanceolata*, (AFP).

H. postica (Gyllenhal). Clints Quarry, Egremont, NY00/12 (7). iv, ix. *Trifolium campestre*, (AFP).

H. punctata (F.). Nr. Beckermert, NY01/06 (7). High Godderthwaite, NY03/06 (6f). Great Coppice, NY11/02 (3). v, vii. *Trifolium repens*, (AFP).

H. rumicis (L.). Nr. Hensingham, NX98/17 (7). Whitehaven, NX98/18 (6r). Nr. Parton, NX98/21 (7). Church Moss, NY01/05 (7). Ponsonby, NY03/04 (5a). Gosforth, NY06/04 (6r). River Calder, NY06/08 (5a). River Bleng, NY09/03 (5a). Haile, NY03/10 (6r). Ennerdale, NY06/15 (6r). Kirkland, NY07/17 (7). Lillyhall, Distington, NY01/24 (7). Cockermouth, NY13/33 (5a). Annaside Bank, SD09/85 (8c). Rabbit Cat How, SD07/96 (3). Hall Carleton, SD07/97 (6r). Beacon Plantation, SD09/94 (3). Whitbeck, SD11/86 (6r). Silecroft, SD13/82 (6r). Nr. Waughfoot Bridge, SD17/87 (5a). Croft Coppice, SD10/96 (3). Birks Plantation, Muncaster, SD12/98 (6r). v-viii. *Rumex crispus*, (AFP), *R. maritimus*, *R. obtusifolius*.

H. suspiciosa (Herbst). Beckermert, NY01/05 (7). Drigg, SD06/98 (7). vi, viii. *Vicia sepium*, (AFP).

H. venusta (F.). Fleswick Bay, NX94/13 (8c). iv. *Ulex europaeus*.

Cionus Clairville, 1798

Cionus scrophulariae (L.). Sandwith, NX96/13 (6r). Whitehaven, NX96/18 (7). Hensingham, NX98/16 (7). Nr. Parton, NX98/20 (6r). Calderbridge, NY04/06 (6r). Gosforth, NY06/03 (6r). Millyeat, Nr. Frizington, NY02/17 (10). Wath Brow, Cleator Moor, NY05/15 (6r). Lamplugh, NY09/21 (6r). Strands, NY11/03 (5a). Gillerthwaite, NY13/14 (6r). Loweswater, NY11/22 (6r). Giles Wood, Cockermouth, NY12/32 (5a). Wythop Woods, Bassenthwaite, NY21/28 (1c). Drigg, SD05/98 (6r). Muncaster, SD10/96 (1d). Haverigg, SD17/78 (7). v-xi. *Scrophularia nodosa*, (AFP).

Cleopus Dejean, 1821

Cleopus pulchellus (Herbst). Hensingham, NX98/17 (7). Gosforth, NY09/04 (6r). Bassenthwaite Lake, NY02/30 (7). Ravenglass Reserve, Drigg, SD07/95 (8d). Eskmeals Reserve, SD07/94 (8d). Muncaster, SD11/97 (6r). iv-viii. *Scrophularia nodosa*, (AFP).

Alophus Schoenherr, 1826

Alophus triguttatus (F.). St. Bees, NX96/11 (8c). Fleswick, NX94/13 (8c). Barrowmouth, Whitehaven, NX96/16 (8c). Braystones, NX99/06 (3). River Ehen, NY00/05 (8d). Seascale, NY03/00 (7). Holmrook, NY08/00 (6r). Bootle, SD08/87 (8d). Saltcoats, SD07/96 (3). Silecroft, SD11/81 (8d). Hodbarrow Point, SD18/78 (8d). Muncaster, SD12/97 (5a). iv-vii,ix. *Plantago lanceolata*, (AFP).

Hylobius Germar, 1817.

Hylobius abietis (L.). Hensingham, NX98/17 (6r). Linkrigg Gill, Lowther Park, NY06/12 (1c). vi,vii. *Pinus* sp. (AFP).

Leiosoma Stephens, 1829

Leiosoma deflexum (Panzer). St. Bees, NX95/12 (8c). Whitehaven, NX96/18 (8c). Hensingham, NX99/15 (6r). Beckermeth, NY02/06 (1d). Haile, NY03/09 (1d). Calderbridge, NY05/06 (1d). Seascale, NY02/02 (3). Gosforth, NY06/04 (6r). Holmrook, NY08/00 (6f). Clints Quarry, Egremont, NY00/12 (7). Lamplugh, NY09/21 (6r). Maryport, NY03/37 (7). Strands, NY10/03 (5b). Horseclose Wood, Cockermouth, NY12/31 (1d). Bootle, SD08/86 (5a). Drigg, SD07/98 (6f). Eskmeals, SD09/91 (6f). Silecroft, SD13/81 (6f). Arnaby, SD18/85 (3). Muncaster, SD11/97 (6r). iii-vii,ix,x. *Anemone nemorosa*, (AFP), *Ranunculus repens*, (AFP).

L. oblongulum Boheman. Cat Gill, Harrington, NX98/23 (8c). v. Taken by general grubbing.

Pissodes Germar, 1817

Pissodes pini (L.). Strands, NY11/03 (1d). v. *Pinus* sp. (AFP).

Magdalis Germar, 1817

Magdalis carbonaria (L.). Parkgate Tarn, NY11/00 (1d). v. *Betula* sp. (AFP).

Anoplus Germar, 1820

Anoplus plantaris (Naezen). Beckermeth, NY02/06 (1d). Haile, NY02/09 (1d). Hallsenna Moor, NY06/00 (1d). Gosforth, NY09/04 (1d). Croasdale Beck, NY09/17 (6r). Parkgate Tarn, NY11/00 (1d). Strands, NY11/03 (1d). Holmrook, NY11/02 (1c). Ennerdale Water, NY12/13 (1d). Muncaster, SD09/97 (1d). Arnaby Moss, SD19/84 (1d). Mill Wood, SD10/97 (1d). iv-viii. *Betula* sp. (AFP), *Salix* sp. (AFP).

A. roboris Suffrian. River Irt, Holmrook, NY10/03 (5a). vii. *Alnus* sp. (AFP).

Mesites Schoenherr, 1838

Mesites tardii (Curtis). Ravenglass, SD09/94 (1d). Muncaster, SD10/96 (1d). iv-xii. *Acer* sp. (AFP), *Betula* sp. (AFP), *Fagus* sp. (AFP), *Fraxinus* sp. (AFP), *Ilex*, sp. (AFP), *Quercus* sp. (AFP). This is a new county record for the species (Read, in press).

Trachodes Germar, 1824

Trachodes hispidus (L.). River Irt, Holmrook, NY08/00 (5a). Kid Beck How, Strands, NY11/04 (1d). Hags Park, Muncaster, SD10/95 (1d). Rainsbarrow Wood, Ulpha, SD19/93 (1d). vi,ix,x. Specimens have been extracted mainly from oak leaf litter and moss.

Cryptorhynchus Illiger, 1807

Cryptorhynchus lapathi (L.). Hallsenna Moor, Gosforth, NY06/00 (9). Bootle, SD08/89 (9). Silecroft, SD13/81 (9). vi,vii. *Salix* sp. (AFP).

Acalles Schoenherr, 1825

Acalles ptinoides (Marsham). Calderbridge, NY05/06 (1d). Croasdale Beck, NY09/17 (5b). Parkbreast Coppice, NY11/00 (1d). The Side, Ennerdale Water,

NY10/14 (1d). Smithy Beck, NY12/14 (1d). Scales Wood, Buttermere, NY16/16 (1d). Chapel Wood, NY19/29 (1d). Dodd Wood, Nr. Thackthwaite, NY14/24 (1d). Birkrigg, NY21/20 (1d). Stonethwaite, NY26/13 (1d). Nicle Wood, Silecroft, SD14/81 (1d). Ravenglass, SD09/95 (1d). Ellerbeck, Birkby, SD11/96 (1d). Rainsbarrow Wood, Ulpha, SD19/93 (1d). i-xi. *Quercus* sp. (AFP), (in leaf litter), *Calluna vulgaris*, (AFP).

A. turbatus Boheman. Gosforth, NY06/03 (6f). Holmrook, NY08/00 (6f). Parkbreast Coppice, NY11/00 (1d). Newbiggin, SD09/93 (6f). Barfield Tarn, Whitbeck, SD10/86 (6f). Silecroft, SD13/80 (6f). vii, viii.

Dorytomus Germar, 1817

Dorytomus melanophthalmus (Paykull). Church Moss, NY01/05 (9). Hallsenna Moor, NY06/00 (9). Holmrook, NY08/00 (5a). Nr. Hall Carleton, SD07&97 (6f). River Irt, SD07/98 (5a). Ravenglass, SD08/96 (1d). Sandscale, SD19/75 (9). Nr. River Mite, Muncaster, SD10/98 (9). Cropple How, SD12/97 (5a). i,iv-vii. *Salix* sp. (AFP).

D. rufatus (Bedel). Silver Tarn, Braystones, NX99/06 (9). Hope Hall, Whitehaven, NX99/18 (9). Nr. Starling Castle, NY01/05 (7). Church Moss, NY01/05 (9). Nursery Wood, Beckermest, NY02/06 (1d). Haile, NY02/09 (1d). Hallsenna Moor, NY06/00 (9). Gosforth, NY09/04 (6r). Leaps Beck, Harris side, NY08/18 (7). Distington Moss, NY00/20 (9). Irton, NY10/00 (3). Parkgate Tarn, NY11/00 (1d). Nr. Bootle, SD08/89 (6r). Ravenglass, SD08/95 (7). Barfield Tarn, Whitbeck, SD10/87 (9). Nr. Greenroad, SD19/83 (6r). Shaw Moss, SD18/85 (9). v-ix. *Salix* sp. (AFP).

D. salicinus (Gyll.). Stub Place, SD08/90 (6f). iv,v. *Salix atrocinerea*, (AFP).

D. taeniatus (F.). Silver Tarn, NX99/06 (9). Nr. Harrington, NX98/23 (9). Church Moss, NY01/05 (9). Nursery Wood, NY02/06 (1d). Hallsenna Moor, NY06/00 (9). Holmrook, NY08/00 (9). Gosforth, NY08/04 (9). Nr. Keeble Bridge, NY00/16 (5a). Nr. Moresby, NY00/18 (1c). Egremont, NY02/11 (2). Nr. Cleator Moor, NY05/14 (6f). Longmoor, Ennerdale, NY06/15 (6f). Parkgate Tarn, NY11/00 (1d). Nr. Bootle, SD08/89 (6f). River Irt, SD07/98 (5a). Nr. Skelda Hill, Eskmeals, SD08/91 (9). Ravenglass, SD08/95 (1d). Barrow Marsh, SD08/97 (6f). Red Hills Quarry, Millom, SD17/78 (7). Barfield Tarn, Whitbeck, SD10/86 (9). Nr. Greenroad Station, SD18/83 (6r). Nr. Low Eskholme, Muncaster, SD11/97 (1d). Nr. Foxfield, SD21/84 (7). iii-ix,xi, *Salix* sp. (AFP).

Notaris Germar, 1817

Notaris acridulus (L.). Hensingham, NX98/17 (5b). Beckermest, NY01/04 (9). Seascale, NY03/03 (6r). Hallsenna Moor, NY06/00 (9). Holmrook, NY08/00 (6r). Frizington, NY02/17 (8d). Rivert Irt, NY10/03 (1d). Loweswater, NY11/22 (9). Ravenglass, SD07/97 (6r). Drigg, SD07/98 (5a). Silecroft, SD13/81 (6r). Shaw Moss, Millom, SD18/85 (9). Broad oak Beck, SD10/95 (5b). Muncaster, SD11/97 (6r). iv-viii. General sweeping.

N. bimaculatus (F.). Drigg, SD06/97 (8s). Ravenglass, SD08/95 (8s). Hags Park, Muncaster, SD10/95 (9). Kirkby in Furness, SD22/81 (8s). iii,iv,vii. General sweeping.

N. scirpi (F.). Dodd Wood, Nr. Thackthwaite, NY12/24 (1d). Wythop Hall, NY20/28 (1d). Rainsbarrow Wood, Ulpha, SD19/93 (1d). i,x,xi. Taken in leaf litter.

Grypus Germar, 1817

Grypus equiseti (F.). Hensingham, NX98/16 (10). Braystones, NX00/04 (7). Church Moss, Beckermest, NY01/05 (7). Weddicar, NY00/17 (3). Drigg, SD06/98 (6r). Ravenglass, SD08/94 (7). Sandscale Haws, SD19/75 (8d). Nr. Greenroad, SD19/84 (7). v-viii. *Equisetum* sp. (AFP).

Orthochaetes Germar, 1824

Orthochaetes setiger (Beck). Nr. Beckermets, NY01/06 (6r). Ravenglass, SD08/95 (7). iv.x. *Ulex europaeus*.

Coeliodes Schoenherr, 1837

Coeliodes dryados (Gmelin in Linnaeus). Beckermets, NY02/06 (1d). Haile, NY03/09 (1d). Calderbridge, NY04/06 (1d). Hallsenna Moor, NY06/00 (1d). Gosforth, NY07/03 (1d). Nr. Frizington, NY02/17 (6r). Parkbreast Coppice, NY11/00 (1d). Kid Beck How, Strands, NY11/04 (1d). Ennerdale Water, NY10/16 (1d). Dodd Wood, Nr. Thackthwaite, NY14/24 (1d). Cockermouth, NY12/32 (1d). Keskadale, NY20/19 (1d). Birkrigg, NY21/20 (1d). Ravenglass, SD09/95 (1d). Fox's Wood, SD18/86 (1d). Ellerbeck, SD11/96 (1d). iv-viii,x-xii. *Quercus petraea* (AFP), *Q. robur* (AFP).

C. erythroleucos (Gmelin in Linnaeus). Parkgate Tarn, NY11/00 (1d). v. *Quercus robur* (AFP).

C. ruber (Marsh). Parkgate Tarn, NY11/00 (1d). Chapel Wood, Wythop, NY19/29 (1d). Nicle Wood, SD14/81 (1d). i,v,vii,x. *Quercus* sp. (AFP).

C. rubicundus (Herbst). Beckermets, NY02/06 (1d). Seascale, NY04/01 (1d). Hallsenna Moor, NY06/00 (2). Edge Wood, NY06/22 (1d). Parkbreast Coppice, NY11/00 (1d). Strands, NY10/03 (1d). The Side, Ennerdale Water, NY11/13 (1d). Smithy Beck, NY12/14 (1d). Muncaster, SD09/97 (1d). iv-vii,xi. *Betula* sp. (AFP).

Zacladus Reitter, 1913

Zacladus geranii (Paykull). Church Moss, Beckermets, NY01/05 (7). Seascale, NY03/01 (7). v-viii. *Geranium sanguineum* (AFP).

Micrelus Thomson, C.G., 1859

Micrelus ericae (Gyll.). Nethertown, NX98/07 (7). Hope Hall, Harris Moor, NX99/18 (4). Harrington, NX98/23 (8c). Hallsenna Moor, NY06/00 (4). Haile, NY02/09 (1d). Gosforth, NY08/04 (6f). Murton Fell, NY07/17 (1c). Parkgate Tarn, NY11/00 (1d). Bowness Knott, Ennerdale, NY10/15 (8m). Seascale, SD04/99 (5b). Shaw Moss, SD19/85 (4). Muncaster, SD10/97 (8m). iv-ix. *Calluna vulgaris*, (AFP), *Erica* sp, (AFP).

Cidnorhinus Thomson, C.G., 1859

Cidnorhinus quadrimaculatus (L.). Silver Tarn, Braystones, NX99/06 (3). Whitehaven, NX95/15 (8c). St. Bees, NX97/10 (3). Bigrigg, NY98/13 (6r). Hensingham, NX99/15 (6r). Nr. Parton, NX98/21 (3). River Ehen, NY00/04 (5a). Seascale, NY02/02 (5b). Beckermets, NY02/06 (1d). Hallsenna Moor, NY06/00 (3). Gosforth, NY06/04 (6r). Calderbridge, NY06/07 (6r). Egremont, NY01/11 (6r). Keekle Bridge, NY00/16 (6r). Kirkland, NY07/17 (6r). Distington, NY00/22 (10). Maryport, NY03/37 (8c). Nr. Allonby, NY07/41 (5h). Parkgate Tarn, NY11/00 (1d). Loweswater, NY11/22 (6r). Cockermouth, NY12/31 (5b). Bootle, SD08/87 (3). Drigg, SD05/98 (6r). Eskmeals, SD08/92 (6f). Haverigg, SD13/78 (7). Whitbeck, SD11/83 (6r). Murthwaite Green, SD13/82 (6r). Shaw Moss, SD18/85 (1d). Corney, SD11/91 (6r). Dunnerholme, SD21/79 (7). iv-ix. *Urtica dioica* AFP).

Ceuthorhynchidius Jacquelin du Val, 1855

Ceuthorhynchidius dawsoni (Brisout). St. Bees, NX95/11 (8c). Ravenglass, SD08/97 (8s). iv,ix. *Plantago coronopus*, (AFP), *P. maritima*, (AFP).

C. troglodytes (F.). Braystones, NX99/06 (8d). Fleswick, NX94/13 (8c). Whitehaven, NX96/16 (8c). Hensingham, NX98/17 (10). Harrington, NX98/24 (7). River Ehen, NY00/05 (8c). Seascale, NY03/00 (8d). Haile, NY02/09

(6f). Nr. Hallsenna, NY06/01 (3). Gosforth, NY08/03 (6f). Clints Quarry, NY00/12 (7). Weddicar, NY01/16 (6r). Black Wood, NY00/18 (6r). Maryport, NY04/37 (7). Bootle, SD07/88 (8d). Nr. Drigg, SD05/98 (6r). Saltcoats, Ravenglass, SD07/97 (8m). Eskmeals, SD09/91 (6f). Silecroft, SD11/82 (8d). Hodbarrow Point, SD18/78 (8d). Muncaster, SD12/97 (5a). Dunnerholme, SD21/79 (7). iv-x. *Plantago lanceolata* (AFP), *P. maritima*, (AFP).

Ceutorhynchus Germar, 1824

Ceutorhynchus alliariae Brisout. Haile, NY02/08 (5b). v. *Alliaria petiolata* (AFP).

C. assimilis (Paykull). Hensingham, NX98/16 (10). Church Moss, NY01/05 (7). Ponsonby, NY03/03 (6r). Gosforth, NY07/04 (5b). Seascale, SD04/99 (3). Ravenglass, SD08/97 (8s). v.vi.viii. *Rorripa*, *Arabis*, *Alyssum* sp. (AFP).

C. cochleariae (Gyll.). Barrowmouth, NX95/16 (8c). Haile, NY03/09 (5a). Arrow Moss, SD13/81 (9). Muncaster, SD11/97 (6r). v.vi. *Cochlearia officinalis* (AFP), *Cardamine pratensis* (AFP).

C. contractus (Marsham). Fleswick Bay, NX94/13 (8c). Sandwith, NX95/15 (6f). Whitehaven, NX96/18 (8c). Hensingham, NX98/16 (10). Parton, NX98/21 (6r). Beckermeth, NY01/05 (7). River Calder, NY03/04 (5a). Calderbridge, NY03/06 (6f). Haile, NY02/08 (5b). Gosforth, NY08/05 (5b). Dub Bridge, NY01/16 (6r). Kirkcill, Loweswater, NY13/20 (6f). Saltcoats, Ravenglass, SD07/96 (5b). Drigg, SD06/98 (5a). Ravenglass, SD08/96 (6f). Whitbeck, Bootle, SD11/86 (6r). Annaside Bank, Bootle, SD09/85 (8c). Kirksanton Haws, SD13/79 (1d). Corney, SD11/91 (6r). iv-vii.x. *Alliaria petiolata*, (AFP), *Alyssum* sp. (AFP), *Cochlearia officinalis* (AFP), *Nasturtium officinale*, *Sisymbrium officinale*, (AFP).

C. erysimi (F.). Hensingham, NX98/16 (10). Whitehaven, NX98/19 (3). Beckermeth, NY01/05 (7). Haile, NY03/09 (5b). Calderbridge, NY04/06 (6f). Nr. Hallsenna, Gosforth, NY06/01 (3). Annaside Bank, Bootle, SD09/85 (6f). Ravenglass, SD07/97 (5b). Newtown Knott, Ravenglass, SD09/95 (3). Whitbeck, Bootle, SD11/86 (6r). Corney, SD11/91 (6r). iv-viii. *Alyssum* sp. (AFP), *Capsella bursa-pastoris*, (AFP), *Nasturtium officinale*, *Sisymbrium officinale*.

C. euphorbiae Brisout. Gosforth, NY08/04 (5a). viii. General sweeping.

C. floralis (Paykull). Whitehaven, NX97/18 (7). Nethertown, NX98/10 (5b). Hensingham, NX98/16 (5b). Beckermeth, NY01/05 (6r). Haile, NY02/09 (1d). Seascale, NY04/03 (6r). Calderbridge, NY04/06 (6f). Hallsenna Moor, NY06/00 (3). Gosforth, NY07/03 (10). Holmrook, NY08/00 (6f). Lamplugh, NY09/22 (6r). Allonby, NY07/41 (5b). Cockermouth, NY12/31 (3). Drigg, SD05/98. Carleton, SD07/97 (6f). Haverigg, SD16/78 (6f). Whitbeck Bootle, SD11/86 (6r). Eskdale, SD14/99 (1c). v-vii.ix. *Alyssum* sp. (AFP), *Alliaria petiolata*, *Capsella bursa-pastoris*, (AFP), *Nasturtium officinale*, *Sisymbrium officinale*.

C. hirtulus Germar. Eskmeals Reserve, SD08/94 (8d). Haverigg, SD13/78 (8d). vi.viii. General sweeping.

C. litura (F.). Braystones, NX99/06 (3). Hensingham, NX98/17 (6f). Harris Moor, NX99/18 (7). Nr. Parton, NX98/20 (6f). Starling Castle, NY01/04 (3). Church Moss, NY01/05 (7). Beckermeth, NY02/06 (1d). Hallsenna Moor, NY06/00 (3). River Calder, NY06/08 (6r). Gosforth, NY08/02 (6f). Blengdale, NY08/04 (6r). Kirkland, NY08/18 (6r). Maryport, NY03/37 (8c). Allonby, NY07/41 (5b). Cockermouth, NY12/31 (5a). Aspatria, NY16/42 (6f). Hyton Marsh, SD07/88 (8c). Carleton, SD07/97 (6r). Drigg, SD06/98 (6r). Ravenglass, SD08/95 (6f). Haverigg, SD13/78 (8d). Barfield Tarn, SD10/86 (3). Silecroft, SD13/81 (3). Greenroad Station, SD19/83 (3). Arnaby, SD18/85 (3). Corney, SD11/91 (7). v-ix. *Cirsium arvense* (AFP).

C. pollinarius (Forster). Silver Tarn, Braystones, NX99/06 (3). Hope Hall, Harris Moor, NX99/18 (6f). Bedlam Gill, Hensingham, NX98/17 (5b). Sandwith,

NX96/18 (6r). Nr. Parton, NX98/21 (3). Gosforth, NY09/03 (6f). River Calder, NY06/08 (5b). Gosforth, Low Boonwood, NY06/04 (6r). Calderbridge, NY05/06 (6r). Seascale, NY05/03 (6r). Hallsenna Moor, NY06/00 (3). Beckermets, NY02/06 (1d). Calder Hall, NY03/04 (6f). Seascale, NY02/02 (7). Beckermets, NY01/06 (6r). Starling Castle, NY01/04 (3). Egremont, NY01/11 (6r). Nr. Keekle, NY00/16 (6r). Moss Dalts, Egremont, NY02/10 (6f). Allonby, NY07/41 (5b). Loweswater, NY11/22 (6r). Aspatria, NY15/42 (1d). Selker Bay, Bootle, SD07/88 (5b). Bootle, SD08/86 (5a). Drigg, SD05/98 (6r). Ravenglass Reserve, SD07/95 (8d). Drigg, SD06/98 (6f). Eskmeals, SD08/92 (7). Waberthwaite, SD09/94 (6f). Ravenglass, SD08/96 (6f). Carleton, SD08/97 (6r). Longmire Wood, SD08/98 (6f). Haverigg, SD16/78 (6f). Barfield Farm, SD10/87 (5b). Silecroft, SD13/82 (6f). Corney, SD11/91 (6r). Dunnerholme, SD21/79 (7). iv-x. *Urtica dioica* (AFP).

C. punctiger (Sahlberg). Hensingham, NY99/17 (6r). Seascale, NY03/03 (6r). Nr. Hallsenna, NY06/01 (6f). Holmrook, NY08/00 (6r). Drigg, SD04/99 (8d). Nr. Drigg, SD07/98 (8d). Eskmeals Reserve, SD08/95 (8d). Sandscale Haws, SD19/75 (8d). Dunnerholme, SD21/79 (7). iv-viii. *Taraxacum officinale*, (AFP).

C. pyrrhorhynchus (Marsham). Maryport, NY03/36 (7). Annaside Bank, Bootle, SD09/85 (8c). Haverigg, SD16/78 (7). Corney, SD11/91 (6r). vii,viii. *Sisymbrium officinale* (AFP).

C. quadridens (Panzer). Whitehaven. NX97/18 (7). Hensingham, NX99/17 (7). Hensingham, NX98/16 (10). Beckermets, NY01/05 (7). Seascale, NY02/02 (6f). Ponsonby, NY03/05 (6f). Sellafeld, NY02/04 (10). Haile, NY03/09 (1d). Seascale, NY04/00 (3). Calderbridge, NY04/07 (3). Hallsenna Moor, NY06/00 (1d). Gosforth, NY07/03 (10). Boonwood Farm, Gosforth, NY06/04 (9). Bleng Bridge, Gosforth, NY08/03 (1d). River Bleng, NY08/04 (9). Clints Quarry, NY00/12 (7). Distington, NY00/22 (10). Edge Wood, Branthwaite, NY06/23 (1d). Hollins Bridge, NY10/03 (5a). Loweswater, NY11/22 (9). Kirkgill Wood, NY13/20 (1d). Dodd Wood, Nr. Thackthwaite, NY14/24 (1d). Annaside Bank, Bootle, SD08/85 (6f). Broadwater Farm, SD08/89 (6r). Drigg, SD05/98 (3). Ravenglass Reserve, SD07/96 (8d). Ravenglass, SD09/95 (1d). Eskmeals Reserve, SD07/95 (8d). Ravenglass Station, SD08/96 (7). Haverigg, SD14/77 (8d). Haverigg, SD16/78 (8d). Whitbeck, Bootle, SD11/86 (6r). Greenroad Station, SD19/83 (3). iv-ix,xi. *Alyssum* sp. (AFP), *Capsella bursa-pastoris* *Cakile maritima* (AFP), *Nasurtium* sp. *Raphanus raphanistrum* (AFP), *Rorippa* sp. (AFP).

C. quercicola (Paykull). Church Moss, Beckermets, NY01/05 (7). viii. *Fumaria officinalis* (AFP).

C. rapae Gyll. Haverigg, SD16/78 (7). vii,viii. *Sisymbrium officinale* (AFP).

C. rugulosus (Herbst). Braystones, NX99/06 (7). Hensingham, NX98/16 (10). Harris Moor, NX98/19 (3). Beckermets, NY01/05 (7). Braystones, NY00/06 (3). Nursery Wood, Beckermets, NY02/06 (1d). Seascale, NY04/00 (8d). Seascale Hall, NY04/02 (3). Nr. Hallsenna Moor, NY06/01 (3). Irton Hall, NY10/00 (3). Brayton Park, Aspatria, NY16/41 (3). Annaside Bank, Bootle, SD09/85 (7). Hall Carleton, Drigg, SD07/97 (6r). Nr. Hall Waberthwaite, SD09/94 (5a). Newtown Knott, Ravenglass, SD09/95 (3). Nan Hill, Whitbeck, SD11/83 (3). Holmegate Farm, SD11/86 (6r). v-viii. *Chamomilla suaveolens* (AFP), *Matricaria chamomilla* (AFP), *M. maritima* (AFP).

C. triangulum Boheman. Nr. Hall Carleton, Drigg, SD07/97 (6r). v,vi. General sweeping.

C. viduatus (Gyll.). Beckermets, NY01/05 (7). Hallsenna Moor, NY06/00 (5b). Calderbridge, NY06/08 (9). River Irt, Holmrook, NY08/00 (5a). Bleng Bridge, Gosforth, NY08/03 (9). Low Thistleton, NY09/04 (6r). Low Wreah, NY00/16 (6r). Moresby, Walkmill Bridge, NY00/18 (6r). Maryport, NY04/37 (9). River Bleng, NY10/03 (5a). Giles Wood, Cockermouth, NY12/32 (9). Saltcoats, Ravenglass, SD07/96 (6f). Hall Carleton, Drigg, SD07/98 (3). Eskmeals Viaduct, SD09/94 (5a). vi-ix. *Stachys palustris*, (AFP).

Rhinoncus Schoenherr, 1825

Rhinoncus bruchoides (Herbst). River Ehen, Beckermert, NY01/04 (5a). Middlebank Farm, NY01/05 (7). Hollins Bridge, Gosforth, NY10/02 (5a). Annaside Bank, Bootle, SD09/84 (8c). Newtown Knott, Ravenglass, SD09/95 (3). Nan Hill, Whitbeck, SD11/83 (5b). Nr. Kirksanton Moss, Silecroft, SD13/80 (3). vi-viii. *Polygonum hydropiper* (AFP), *P. lapathifolium* (AFP), *P. persicaria* (AFP).

R. castor (F.). River Ehen, Braystones, NY00/04 (8d). Sellafield Station, NY02/02 (8d). River Calder, Ponsonby, NY03/04 (5a). Hallsenna Moor, NY06/00 (5b). Seascale Hall, NY04/03 (8d). Irton, NY09/00 (8d). Nr. Hall Bolton, Gosforth, NY08/03 (6r). Drigg, SD04/99 (8d). Nr. Saltcoats, Ravenglass, SD07/96 (8d). Ravenglass Reserve, SD06/96 (8d). Irt Viaduct, SD06/98 (7). Eskmeals Reserve, SD08/94 (8d). Beacon Plantation, SD09/94 (1d). Sandscale Haws, SD19/75 (8d). Coteley Bank, Silecroft, SD11/81 (8d). Nan Hill, Whitbeck, SD11/83 (6f). Roanlands Farm, SD18/85 (3). Hinninghouse Bridge, Muncaster, SD12/97 (5a). iv-ix. *Rumex acetosella* (AFP), *R. crispus*.

R. inconspicuous (Herbst). Haverigg, SD16/78 (6r). Greenroad, SD18/83 (6r). vii, viii. *Polygonum amphibium* (AFP).

R. pericarpus (L.). Braystones, NX99/06 (3). Patterring, Holes, St. Bees, NX95/11 (8c). Fleswick Bay, NX94/13 (8c). Sandwith, NX96/13 (6r). Whitehaven, NX96/18 (8c). Low Walton Wood, NX98/13 (6r). Hensingham, NX98/16 (7). Overend Quarry, NX99/16 (7). Church Moss, Beckermert, NY01/05 (3). Nr. Braystones, NY00/06 (3). Seascale Hall, NY03/03 (6r). Nr. Calder Hall, NY03/04 (6r). Nursery Wood, NY02/06 (1d). Fleming Hall, NY05/03 (6r). Hallsenna Moor, NY06/00 (1d). Gosforth, NY06/03 (6r). Boonwood, NY06/04 (6r). Holmrook, NY04/00 (6r). Sowermyrr Farm, NY08/04 (6f). Nr. Keele Bridge, NY00/16 (6r). Black Wood, Moresby, NY00/18 (6r). Egremont, NY02/10 (6r). Jobbygill Wood, Frizington, NY02/17 (8d). Kirkland, NY07/17 (6r). Nr. Gillgarran, Distington, NY02/23 (6r). Maryport, NY04/38 (3). Allonby, NY07/41 (5b). Parkgate Tarn, NY12/00 (3). Loweswater, NY11/22 (6r). Horseclose Wood, Cockermouth, NY12/31 (5a). Aspatria, Whitelees Wood, NY17/41 (7). River Annas, Bootle, SD08/87 (5a). Nr. Broadwater Farm, Bootle, SD08/89 (6r). Nr. Seascale, SD04/99 (8d). Nr. Saltcoats, SD07/96 (3). Nr. Drigg, SD07/98 (5a). Ravenglass, SD08/95 (7). Muncaster Mill Bridge, SD09/97 (5a). Haverigg, SD16/78 (6f). Whitbeck, Bootle, SD11/86 (6r). Nr. Kirksanton Moss, SD13/80 (3). Silecroft, SD13/82 (6f). Greenroad, SD19/83 (5b). Shaw Moss, SD18/85 (5b). Nr. Broadgate, SD18/86 (5b). Corney, SD11/92 (6r). Muncaster, SD10/97 (3). iii-ix. *Rumex acetosa* (AFP), *R. acetosella* (AFP), *Rumex crispus* (AFP). *R. obtusifolius* (AFP), *R. maritimus*, *Polygonum persicaria*.

R. perpendicularis (Reich). Beckermert, NY01/05 (3). Braystones, NY00/06 (6f). Nr. Seascale Hall, NY04/03 (8d). Drigg, SD06/98 (6f). Kirksanton Haws, SD13/79 (3). Kirksanton Moss, SD13/80 (9). Greenroad, SD18/83 (6r). vi-viii. *Polygonum aviculare* (AFP), *P. amphibium* var. *terrestre* (AFP), *P. persicaria*, *Rumex acetosella*.

Phytobius Dejean, 1835

Phytobius comari (Herbst). Braystones, NX99/06 (9). Church Moss, NY01/05 (9). Hallsenna Moor, Gosforth, NY06/00 (9). Nr. Seascale, SD04/99 (9). Kirksanton Moss, SD13/80 (9). vi-ix. *Potentilla palustris*, (AFP). *P. erecta* (AFP), *Lythrum salicaria* (AFP).

P. quadrituberculatus (F.). Nr. St. Bees lighthouse, NX95/14 (6r). Hensingham, NX98/17 (5b). Moss Wood, Hensingham, NX99/18 (1c). Beckermert, NY01/05 (7). Nr. Braystones, NY00/06 (9). Nr. Hallsenna, NY06/01 (3). Irton, NY09/00 (3). Gosforth, NY09/03 (3). Nr. Keele Bridge, NY00/16 (6r). Jobbygill Wood, Nr. Frizington, NY02/17 (8d). Distington, NY00/22 (10). Gilgarran,

NY03/23 (1d). Irton Hall, Holmrook, NY10/00 (3). Annaside Bank, Bootle, SD09/84 (8c). Ravenglass Reserve, SD06/96 (8d). Nr. Hall Carleton, Drigg, SD06/97 (8s). Irt viaduct, SD06/98 (8s). Ravenglass, SD09/95 (3). Summer Hill, Silecroft, SD11/82 (8d). iv-xi. *Polygonum lapathifolium*, (AFP), *P. persicaria* (AFP), *P. aviculare* (AFP), *Rumex acetosa*, *Rumex crispus*, *Glaux maritima* (AFP).

P. waltoni Boheman. Murthwaite Moor Wood, Gosforth, NY09/03 (3). viii. *Polygonum hydropiper* (AFP).

Poophagus Schoenherr, 1837

Poophagus sisymbrii (F.). Gosforth, NY08/04 (5b). Church Moss, Beckermeth, NY01/05 (5b). Horseclose Wood, Cockermouth, NY12/31 (3). Stub Place, Eskmeals, SD08/90 (5b). Drigg, SD06/98 (5b). v,vii. *Nasturtium officinale* (AFP).

Orobitis Germar, 1817

Orobitis cyaneus (L.). Nr. Keekle, NY00/16 (7). Drigg, SD05/97 (8d). Eskmeals Reserve, SD07/94 (8d). Nr. Haverigg, SD13/78 (8d). iv,vi,vii. *Viola canina* (AFP).

Limnobaris Bedel, 1885

Limnobaris pilistriata (Stephens). Nr. Seascale, NY04/00 (3). Drigg, SD05/99 (8d). Barrow Marsh, Ravenglass, SD08/96 (8s). River Esk, SD09/94 (8s). iv,v,vii. *Carex* sp. (AFP).

Anthonomus Germar, 1817

Anthonomus bituberculatus Thomson, C.G. Snellings Mire, NX99/08 (6f). Nr. Sandwith, NX96/15 (6r). St. Bees, NX98/10 (6r). Beck Bottom, Hensingham, NX98/17 (6f). Nr. Harrington, NX98/23 (8c). Beckermeth, NY01/05 (7). Braystones, NY00/07 (6r). Calder Hall, NY03/04 (6f). Calderbridge, NY05/07 (6f). Hallsenna Moor, NY06/00 (2). Scale Beck, NY08/05 (3). Nr. Bolton Hall, Gosforth, NY08/02 (6f). Lynnwood, Egremont, NY02/10 (6f). Wilton, NY04/11 (6f). High Cockhow, NY05/14 (6f). River Irt, NY10/04 (1d). Cockermouth, NY12/31 (5a). Whitelees Wood, Aspatria, NY17/41 (6f). Nr. Annaside, Bootle, SD08/87 (6f). Nr. Bootle Station, SD08/89 (6f). Nr. Hall Carleton, Drigg, SD07/97 (6r). Nr. Drigg, SD06/98 (6f). Flatts Wood, SD08/90 (6f). Monk Moors, SD08/92 (6f). Esk viaduct, SD08/94 (3). Hodbarrow Point, SD18/78 (7). Nr. Duddon Mount Farm, SD18/82 (6f). Muncaster, SD11/97 (6f). ii-viii,xii. *Crataegus monogyna* (AFP). *Prunus spinosa* (AFP).

A. brunnipennis (Curtis). Nr. Braystones, NX99/06 (7). Nr. Harrington, NX98/23 (8c). Beckermeth, NY01/05 (9). Nr. Braystones, NY00/06 (3). Seascale, NY03/-2 (9). Hallsenna Moor, Gosforth, NY06/00 (5b). Murthwaite Moor Wood, NY09/03 (1c). Low Thistleton, NY09/04 (9). Longmoor, Ennerdale, NY06/15 (6r). Nr. Creasdale Farm, NY09/17 (3). Maryport, NY04/38 (3). Nr. Gaterigghow Bridge, NY10/04 (5a). Rake Beck, Ennerdale, NY10/15 (9). Kirkgill Wood, Loweswater, NY1320 (1c). Nr. Seascale, SD04/99 (3). Ravenglass Reserve, SD06/96 (8d). Nr. Drigg, SD07/98 (5a). Eskmeals Reserve, SD08/94 (3). iv-x. *Potentilla erecta* (AFP).

A. pedicularius (L.). Sandwith, NX95/14 (6r). Hensingham, NX99/15 (6f). Beck Bottom, NX98/17 (5b). Hope Hall, Harris Moor, NX99/18 (6f). Harrington, NX98/23 (8c). Church Moss, NY01/05 (7). Nr. Beckermeth, NY01/06 (7). Nr. Calder Hall, NY03/04 (6f). Nursery Wood, NY02/06 (6f). Hallsenna Moor, NY06/00 (1d). Low Boonwood, Gosforth, NY07/04 (6r). Calderbridge, NY06/07 (6r). Nr. River Bleng, NY08/04 (6r). Clints Quarry, NY00/13 (7). Nr. Keekle Bridge, NY00/16 (6r). Nr. High Cockhow, NY05/14 (6f). Nr. Kirkland, NY07/17 (6f). Croasdale Beck, NY08/16 (5b). Lamplugh, NY08/17 (6f). Edge Wood, Dean, NY06/23 (6f). Irton Park, NY11/00 (1c). Nr. Parkgate Tarn, NY12/00 (1c). Nr. Gillerthwaite, Ennerdale, NY13/14 (5b). Kirkgill Wood, Loweswater,

NY13/20 (6f). Horse Close Wood, Cockermouth, NY12/31 (3). Brayton Park, Aspatria, NY16/41 (3). Nr. Annaside, Bootle, SD08/87 (6f). Irt viaduct, Drigg, SD06/98 (7). Nr. Newbiggin, SD09/93 (6r). Newtown Knott, Ravenglass, SD09/94 (3). Ravenglass, SD08/96 (6f). Nr. Kirksanton, SD13/79 (6f). Haverigg, SD17/78 (7). Nr. Barfield Tarn, Whitbeck, SD10/86 (6f). Nr. Waughfoot Bridge, SD17/87 (6f). Corney, SD11/92 (6r). Muncaster, SD12/98 (1d). Dunnerholme, SD21/79 (7). iv-viii. *Crataegus monogyna* (AFP).

A. pomorum (L.). High Frith Gill, Nr. Santon Bridge, NY11/00 (1d). Bolton Wood, NY10/04 (5b). Greenroad Station, SD19/84 (6f). v-vii. *Malus sylvestris* (AFP).

A. rubi (Herbst). Sandscale Haws, SD19/75 (8d). v. *Rosa* sp. (AFP).

Furcipes Desbrochers, 1868

Furcipes rectirostris (L.). River Bleng, NY09/03 (5a). Nr. Gaterigghow Bridge, NY10/04 (5a). v,vi,viii. *Prunus padus* (AFP).

Curculio Linnaeus, 1758

Curculio nucum L. Robertgate Bridge, NY04/06 (6f). vii. *Fraxinus*.

C. pyrrhoceras Marsham. Addyhouse Wood, NY06/00 (1d). Parkgate Tarn, NY11/00 (1d). Mill Wood, Muncaster, SD09/97 (1d). Brankenwall Plantation, SD09/97 (1d). Muncaster Fell, SD11/98 (1d). v-viii. *Quercus* sp. (AFP).

C. salicivorus Paykull. St. Bees, NX98/13 (6f). Moss Wood, Hensingham, NX99/18 (1d). Church Moss, Beckermeth, NY01/05 (9). Carleton Moor, Wood, NY02/09 (1d). Seascale, NY05/03 (6f). Hallsenna Moor, Gosforth, NY06/00 (9). Low Boonwood, NY06/04 (6r). River Calder, NY06/08 (5a). Nr. Hall Bolton, NY08/03 (9). Blengdale, NY08/05 (5a). Nursery Wood, NY02/06 (6f). Parkgate Tarn, NY11/00 (1d). Nr. Broadwater Farm, Bootle, SD08/89 (6f). Nr. Mite House, Drigg, SD07/97 (6f). Beacon Plantation, SD09/95 (1d). Mill Wood, Ravenglass, SD09/97 (1d). Nr. Longmire Wood, SD08/98 (6f). Haverigg, SD16/78 (6f). Whitbeck, SD11/86 (6r). Arrow Moss, SD13/81 (9). Greenroad Station, SD19/83 (6r). Shaw Moss, Arnaby, SD18/85 (9). Corney, SD11/91 (6r). Cropple How, Muncaster, SD12/97 (5a). v-viii. *Salix* sp. (AFP).

Tychius Germar, 1817

Tychius flavicollis Stephens. Nr. Braystones, NY00/04 (8d). Seascale, NY04/00 (8d). vi. *Lotus corniculatus* (AFP).

Miccotrogus Schoenherr, 1825

Miccotrogus picirostris (F.). Drigg, SD06/98 (6f). v. *Trifolium* sp. (AFP).

Ellescus Dejean, 1821

Ellescus bipunctatus (L.). Gosforth, NY08/04 (6r). Mill Wood nr. Strands, NY11/03 (9). Mill Wood, Muncaster, SD09/97 (1d). vi,viii. *Salix* sp. (AFP).

Mecinus Germar, 1821

Mecinus collaris Germar. River Irt, Nr. Saltcoats, SD06/96 (8s). Nr. Irt viaduct, SD06/98 (8s). Broadoak Beck, SD10/95 (8s). vi,vii. *Plantago coronopus* (AFP), *P. maritima* (AFP).

M. pyraister (Herbst). Pattering Holes, St. Bees, NX95/11 (8c). Nr. Marsh House, NX97/10 (7). Whitehaven, NX96/18 (8c). Hensingham, NX98/16 (7). Hope Hall, Harris Moor, NX99/18 (2). Nr. Moresby Hall, NX98/21 (3). Harrington, NX98/29 (7). River Ehen, Beckermeth, NY00/05 (5a). Nr. River Calder, NY03/04 (6r). Seascale, NY04/00 (8d). Nr. Hallsenna Moor, NY06/01 (3). Kirkland, NY07/17 (3). River Cocker, Cockermouth, NY12/30 (5a). Nr. Annaside Bank, Bootle, SD08/85 (8c). Nr. Rabbit Cat How, SD07/96 (3). Nr. Mite Houses, SD07/97 (6f). Nr. Irt viaduct, SD07/98 (6f). Eskmeals Station, SD08/94 (6f). Nr. Silecroft, SD13/79 (6f). Townend Bank, SD10/83 (8d). ii, iv-ix,xii. *Plantago lanceolata* (AFP).

Gymnetron Schoenherr, 1825

Gymnetron antirrhini (Paykull). Nr. Braystones, NX99/06 (7). Nr. Parton, NX98/21 (7). Nr. Workington, NX99/30 (7). Starling Castle, NY01/04 (7). Nr. Sellafield Station, NY02/03 (7). Maryport, NY03/36 (7). Nr. Esk Viaduct, SD08/94 (7). Haverigg, SD15/78 (8d). Nr. Nanhill, Whitbeck, SD11/83 (7). Silecroft, SD12/82 (7). vi, viii. *Linaria vulgaris*, (AFP).

G. labile (Herbst). Harrington, NX98/24 (8d). River Irt, NY05/00 (5a). Church Moss, Beckermest, NY01/05 (7). Dubbs Moss, Cockermouth, NY10/29 (2). Eskmeals, SD08/92 (6r). v, vi. *Plantago lanceolata*, (AFP).

Rhynchaenus Clairville, 1798

Rhynchaenus fagi (L.). Nr. Sandwith, Whitehaven, NX96/13 (6r). Low Walton Wood, NX98/13 (1d). Summer Grove, NX99/15 (1d). Hensingham, NX99/17 (6r). River Calder, NY03/04 (5a). Haile, NY02/09 (6f). Nr. Stephney, NY04/06 (6f). Hallsenna Moor, NY06/00 (1d). Low Boonwood, NY06/04 (6r). Holmrook, NY08/00 (6r). Gosforth, NY08/03 (9). Clints Quarry, NY00/12 (7). Egremont, NY02/10 (1d). Edge Wood, NY06/22 (1d). Parkgate Tarn, NY11/00 (1d). River Irt, NY11/03 (5a). Nr. Lamplugh, NY10/22 (6r). Dodd Wood, NY14/24 (1d). Horse Close Wood, Cockermouth, NY12/31 (1d). Wythop Woods, NY20/29 (1d). Ravenglass, SD08/95 (1d). Greenroad, SD19/83 (6r). Fox's Wood, Arnaby, SD18/86 (1d). Muncaster, SD11/97 (1d). Eskdale Green, SD14/99 (5a). iv-viii, xi. *Fagus* sp. (AFP).

R. foliorum (Müller). River Irt, Drigg, SD07/98 (3). vi. *Salix* sp. (AFP).

R. quercus (L.). Hallsenna Moor, NY06/00 (1d). Parkgate Tarn, NY11/00 (1d). Dodd Wood, NY14/24 (1d). Ravenglass, SD09/95 (1d). v, viii, xi. *Quercus* sp. (AFP).

R. rusci (Herbst). Church Moss, Beckermest, NY01/05 (9). Nursery Wood, NY02/06 (1d). Carleton Moor Wood, NY02/09 (1d). Addyhouse Wood, Hallsenna Moor, NY06/00 (1d). High Frith Gill, NY11/00 (1d). Smithy Beck, Ennerdale, NY12/14 (1d). Aspatria, NY15/42 (1d). Wythop Woods, NY20/29 (1d). Ravenglass, SD09/95 (1d). Arnaby Moss, SD19/84 (2). Fox's Wood, SD18/86 (1d). Barrel Bank, SD10/95 (1d). Muncaster, SD12/98 (1d). v-ix. *Betula* sp. (AFP).

R. salicis (L.). Hallsenna Moor, Gosforth, NY06/00 (2). Low Boonwood, NY06/04 (6r). Low Thistleton, NY09/04 (6r). Nr. Broadwater Farm, Bootle, SD08/89 (6r). Drigg, SD07/98 (5a). Beacon Plantation, Ravenglass, SD09/94 (1d). Sandscale Haws, SD19/75 (9). Corney, SD11/91 (6r). v-ix. *Salix* sp. (AFP).

R. stigma (Germer). River Irt, NY10/03 (1d). Aspatria, NY15/42 (1d). vii, viii. *Alnus glutinosa* (AFP).

Ramphus Clairville, 1798

Ramphus oxyacanthae (Marsham). Nr. Loughrigg, St. Bees, NY98/11 (6f). Nr. Watch Hill, NY01/04 (7). Stephney, NY04/07 (6f). Whitelees, Wood, Aspatria, NY17/41 (7). Nr. Annaside, Bootle, SD08/87 (6f). Nr. Hall Carleton Farm, Drigg, SD07/97 (6r). Newtown Knott, SD09/95 (1d). Nr. Red Hills Quarry, Millom, SD17/78 (7). Barfield Tarn, Whitbeck, SD10/86 (6f). Millom, SD17/81 (6f). Hinninghouse Bridge, Muncaster, SD12/97 (5a). v-viii. *Crataegus monogyna* (AFP).

R. pulicarius (Herbst). Silver Tarn, NY99/06 (9). Church Moss, NY01/05 (7). Hallsenna Moor, NY06/00 (9). Nr. Low Boonwood, Gosforth, NY06/04 (6r). Nr. Sowermyr Farm, NY08/04 (6r). Nr. Bolton Head, NY09/04 (6r). Bootle, SD08/89 (6f). Hall Carleton, Drigg, SD07/98 (6r). Barrow Marsh, Ravenglass, SD08/97 (8s). Sandscale Haws, SD19/75 (9). Barfield Tarn, Whitbeck, SD10/86 (9). Nr. Greenroad Station, SD19/83 (6r). Arnaby Moss, SD19/84 (1d). v-vii. *Salix* sp. (AFP).

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BOOK REVIEW

The Mitchell Beazley Pocket Guide to Butterflies, by Paul Whalley. London, 1980. ISBN 085533 3480. 169 pp., about 930 coloured figures. £3.95.

This book covers all the recognised butterflies of Europe west of the Soviet Union, and also figures sixteen of the common day-flying moths. A brief introduction is followed by concise notes on each species of butterfly, giving its type of habitat, wing span, flight period, larval food-plants, and distribution. These are usually set beneath the relevant coloured figures of adults and in some cases of their larvae. Critical characters for the identification of some, though perhaps not enough, of the more difficult species are mentioned. Both English and scientific names are provided, though for the latter without name or date of the author. The nomenclature of families, genera and species follows that in the check list to Higgins & Riley's *Field Guide* (1980 ed.) adding several newly discovered species; but, for reasons which are not explained, the order of families is very different, as is in many cases the arrangement of genera and of the species within them. This can be a hindrance to quick reference in the field and to easy recording of observations.

The species notes often contain some account of sub-specific and other variations; but considerations of space have clearly prevented systematic treatment of these. The distribution notes, very compressed, are not wholly satisfactory, since the list of countries named for some species is not complete, and the information given about the presence or absence of others on Mediterranean islands is fragmentary; mention of Cyprus and of all the Aegean islands except Crete is also omitted, perhaps on geographical grounds. A more serious weakness is the treatment of some two dozen species only in very short foot-notes below the sections on species which they most resemble. About half of these are, indeed, figured; but an extra half dozen pages could have been usefully afforded to give them the fuller treatment used for other species from which they must be distinguished. There is no mention of the need for structural examination to confirm identifications of difficult species.

The figures by Richard Lewington are of high quality both in clarity of detail and in colour, and the author has contrived to pack an enormous amount of useful information into the small compass required. This book is good value for its modest price.

R.F.B.

Amblypelta spp. (Hem: Coreidae), new Australian records.—Additional records to the paper on *Amblypelta* (*Proc. Trans. Br. ent. nat. Hist. Soc.* 14: 112-114, 1981) have kindly been forwarded to the writer by Mr. E.S.C. Smith of Kimberley Research Station, Kununurra, Western Australia.

The first occurrence of this genus in Western Australia is a record of *A.l. lutescens* (Dist.) at Lake Argyle, just beyond the Northern Territory boundary, reported in April 1982.

Two additional food plants for *A. theobromae* Brown are cashew nut (*Anacardium occidentale*) and annatto (*Bixa orellana*) in Papua New Guinea in 1974.

It is interesting to note that another cacao pest, the Mirid *Helopeltis theobromae* Müller, was also reported feeding on annatto in West Malaysia (*Bull. ent. Res.* 30 (3): 343-344, 1939).—R.A. Lever.

PROFESSOR HERING MEMORIAL RESEARCH FUND REPORT 1981

Seven applications were received and two grants were made:

- (1) D.J. de Courcy Henshaw, FRES. £100 for travel expenses in connection with the study of Agromyzidae (Diptera) at Malham Tarn Field Centre, Yorkshire.
- (2) The University of Bristol Botanical and Zoological Expedition to East Kenya. £75 towards a project which includes the collection of microlepidoptera in an area which has not previously been studied. The specimens collected are to be donated to the British Museum (Natural History).

A sum of £75 remains, an application for which is under consideration.

A report has been received from Miss Graciela Valladares who received a grant in 1980 for the study of Agromyzidae in Argentina. She had a very successful season and discovered several species new to science.

A.M.E.

BOOK REVIEW

Animal Life of the Galapagos, by Norman Hickin. 236 pp., 103 B & W illustrations. Ferundine Books 1980. £6.65.

This handbook to the archipelago comes in a 9" x 6" format between stiff covers and is printed on good quality paper. As a guide to the visitor it serves its purpose well. All the major animal groups are covered, including invertebrates which have not been given short shift as happens with so many books of this kind. The text is informative and highlights the unique nature of the islands and of the fauna. The illustrations are generally good and have been given a full page each, irrespective of detail. Of particular usefulness to the visitor will be the chapter by Julian Fitter giving details of travel, health, accommodation and climate amongst other topics.

For those of us who are not fortunate enough to be able to visit the islands I feel the book is of limited interest. Rather than try to cover as many species as possible the author could have taken more selective examples and emphasised in more detail their habitat requirements and conservation. With such a small fauna (there are only nine species of butterflies and eighty-nine moths) it might have been practical to list in appendices the species and deal with the more interesting ones in the text. The book would have benefitted from a few colour illustrations either of species or preferably habitats to complement the author's own illustrations. This would have made the guide a more attractive proposition for people with a general interest in the area whilst thorough appendices of species would have interest the more serious student of island ecosystems.

M.H.

AN IDENTIFICATION GUIDE TO BRITISH CLUSIIDAE

by ALAN E. STUBBS

Nature Conservancy Council, 19/20 Belgrave Square, London SW1X 8PY

Uncertainties over the definition of some of our 10 species of Clusiidae have made the study of this family very unsatisfactory. The most serious deficiency has been the unreliable, and in some cases erroneous characters used in the separation of *Clusiodes* species in Czerny (1924), Melander & Argo (1924) and Seguy (1934). Collin (1912) had set a sound example when he described three species new to science on the basis of genital characters, but the later works did not illustrate all the remaining *Clusiodes* species and Collin (1953, 2 papers) himself failed in this respect when describing *facialis* new to science and *apicalis* new to Britain without illustration. The only other important reference which has come to attention is that by Tuomikoski (1933) who described *C. freyi* as a new species and illustrated the genitalia of several species found in Finland.

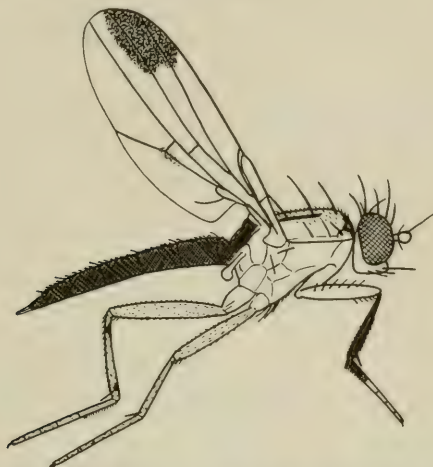


Fig. 1 *Clusiodes albimana* female, one of the commonest Clusiidae. The markings vary between specimens, that illustrated being relatively pale. The abdomen is black, the thorax orange with black markings and a white stripe between the wing base and humeri, the legs are yellow (often with more extensive black), the front tibia and metatarsus are black and the rest of the tarsus is white. The head and antennae are yellowish (the third antennal segment often being more blackish).

BIOLOGY

Clusiids breed in dead wood, larvae and pupae often being common under bark and in relatively soft wood. As a consequence the adults are to be found on dead wood or within adjacent vegetation. Sweeping around such situations, especially in moderate or dense shade, will often yield specimens of these very characteristic flies.

Larvae have a spine associated with each posterior spiracle (family key, Brindle & Smith, 1978). The puparium of *Clusia flava* is illustrated by Smith (1950), who reviews earlier published rearing records of *Clusiodes albimana* and *C. gentilis*. However there is still a need for bred material in order to produce a comprehensive key to the early stages and as yet little is known of the ecology of the various species.

RECOGNITION OF FAMILY

These are mostly rather elongate flies, always with a cloud on the wing tip near the apex (though in *Clusia* this cloud is weak and in *Paraclusia* other clouds are also present). In the common genus *Clusiodes* the species have the thorax marked orange brown and black, or black with a white stripe in front of the wings. Other genera have the body coloured yellow (*Clusia*), black (*Heteromerina*) or variegated (*Paraclusia*).

The Clusiidae have a break in the wing costa at the apex of Sc and Sc reaches the wing margin. The post verticals are divergent (or absent). Vibrissae are present. The tibiae have a pre-apical bristle.

IDENTIFICATION AND DISTRIBUTION NOTES

Key to Genera

1. Large species (body length about 7 mm); wings with 3 spots (markings at outer cross vein, wing tip and about end of R_1) *Paraclusia*
- Smaller species. Wings without spot over outer-cross vein 2
2. Antennae widely separated, as far apart as the width of an eye [non-British *Hendelia*]
- Antennae relatively close together at base 3
3. The most anterior pair of orbital bristles (bristles close to top eye margin) curve inwards towards each other, in contrast to the more posterior pair/pairs. Thorax completely black or abdomen yellow 4
- All orbital bristles curved upwards and backwards. Thorax partly pale, abdomen never yellow *Clusiodes*
4. Thorax and abdomen entirely black (small species like *Clusiodes*) *Heteromerina*
- Thorax and abdomen entirely yellow, or only very narrow black stripes on thorax *Clusia*

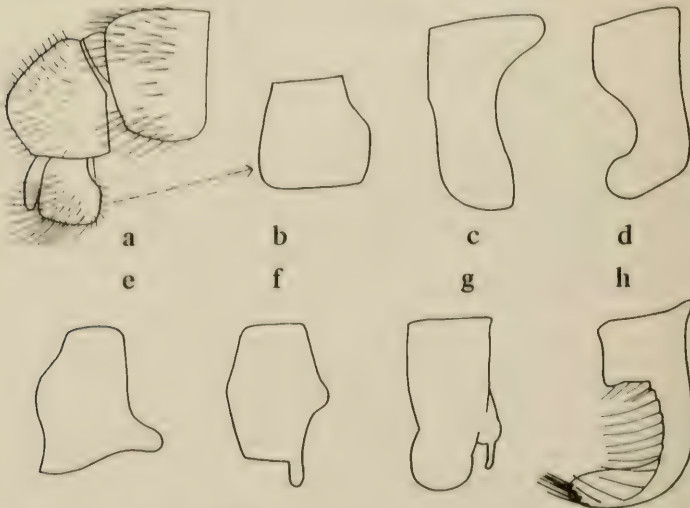


Fig. 2 Male genitalia of *Clusiodes* species: a, end of abdomen of *albimana* to show position of outer lobes, all illustrations being of same orientation; b, *albimana*; c, *gentilis*; d, *caledonica*; e, *geomyzina*; f, *fascialis*; g, *apicalis*; h, *verticalis*.

Clusiodes

Previous accounts have sometimes paid too much attention to dubious colour characters and certain bristle characters are not completely reliable. It is best therefore to check the male genitalia. The genital lobes can sometimes be seen in dried material but identification is easiest whilst the material is still fresh or the genitalia can be extended before drying. The illustrations are from prepared specimens in the British Museum collection; in species such as *geomyzina* the shape of the genital lobes varies considerably with the angle of view and for this reason illustrations from the literature of non-British species are not given in the absence of comparative material.

Since specimens are often common, it is as well to obtain several to be sure of obtaining a male and in any event several similar species can occur together.

If orbital or thoracic bristles have been knocked off, the basal pits are usually still visible.

1. No dorso-central bristles in front of suture (sub-genus *Clusaria*) 2
- A pair of dorso-central bristles present in front of suture 8
2. Thorax partly rusty brown on dorsal surface 3
- Thorax black apart from a white stripe in front of the wing base (incorporating anterior humerus and notopleural area) 5
3. Thorax with 4 dorsal stripes; no stripe on pleurae . [non-British *nubila* Mg.]
- Thorax with 2 dorsal stripes; usually at least a trace of a stripe at top of pleurae 4
4. Face darkened (dusky black or dusky red) *facialis* Coll.
- Face pale yellow (see comments under *facialis*) . [non-British *ruficollis* Mg.]
5. Costal margin of wing clouded for most of length (as from tip of vein R₁) *geomyzina* (Fln.)
- Costal margin clouded for at most half its length 6
6. Face in male white (genitalia rather like *apicalis*) [non-British *freyi* Tuomikoski]
- Face in male dark 7
7. Genitalia in male as illustrated *apicalis* (Zett.)
- Genitalia in male rather similar to *geomyzina* . . [non-British *picipes* Zett.]
8. Vertical bristles present (lying directly behind ocellar triangle) (sub-genus *Clusiodes*) 9
- Vertical bristles absent (take care they have not been knocked off); male genitalia with long curved lobes with cluster of spines at apex (normally obvious even in a dried specimen) (sub-genus *Columbellia*) *verticalis* (Collin)
9. Normally 3 pairs of orbital bristles. Male genitalia with short lobes *albimana* (Mg.)
- Normally with 2 pairs of orbital bristles. Male genitalia with elongate lobes 10
10. Male genitalia with straight posterior edge to lobe (southern species) *gentilis* (Coll.)
- Male genitalia strongly concave on posterior edge of lobe (Scotland) *caledonica* (Coll.)

Footnote:— The comments on distribution and ecology are based on material seen by me. The Diptera Recording Schemes field meeting in the Spey Valley in June 1982 found *C. caledonica* and *C. geomyzina* to be associated with pine and *C. apicalis* with birch, together with *C. albimana* and *C. fascialis* with deciduous trees. I am advised that *C. fascialis* is frequent in parts of eastern England. The known Irish fauna comprises *Clusia flava*, *Clusiodes albimana*, *C. caledonica*, *C. gentilis* and *C. verticalis* (see *Irish Nat. J.* 19: 263-4 and 401-2).

C. albimana (Mg.) A very common southern species. Specimens with only a weakly developed third orbital bristle can cause confusion with *gentilis* and there is a specimen in the British Museum with two strong orbitals on one side and three on the other. The vibrissae are very strong and straight in *albimana* but intermediates towards the weaker curved vibrissae of *gentilis* are common.

The face is normally dark in *C. albimana* but a scarce yellow-faced variety has been named *pallidior*; the genitalia seem to be very similar and the question of the taxonomic status of this form is left undecided.

C. gentilis (Collin). Common in the south and often occurring with *albimana*.

C. caledonica (Collin). In Britain this is apparently confined to the Scottish Highlands, but only a few records exist.

C. verticalis (Collin). Scattered records are known for England, Scotland and Wales. A specimen with apparently intact bristles, but no post-verticals, proved on inspection of the genitalia to be *gentilis*. Thus great care needs to be taken in recording this species.

C. facialis (Collin). A rare southern species. Two males have an associated female with a pale face. It is thus possible that *ruficollis* is not a distinct species; the poor genitalia illustration of *ruficollis* in Seguy (1934, fig. 472) shows the outer lobe to be similar to that of *facialis* (there is a hint of a lower thumb-like process which could be turned underneath).

C. geomyzina (Fall.). Though distinctive, the costal cloud is often weak. This species is only known from the Scottish Highlands and, being a very dark species, it requires comparison with *apicalis* and possibly the non-British *picipes*. The genitalia of the latter species are very similar to *geomyzina*, as illustrated by Tuomikoski (1934) but only *geomyzina* has such an extensive wing cloud.

C. apicalis. The very few British specimens are from the Scottish Highlands. The male genitalia are distinct among British species, but the similar Finnish *freyi* has short spines on the inner surface of the peg on the lower margin and the lower corner of the front margin of the lobe is more bulbous.

Heteromeria nigrimana (Loew). Since on present knowledge the dark species of *Clusiodes* (with a white stripe in front of the wing base) are confined to the Scottish Highlands, an all black clusiid in southern England should readily be recognised as something special. There is a single species, *H. nigrimana*, with old records for Moccas Park in Herefordshire and Woodditton Wood in Cambridgeshire.

Clusia flava (Mg.). Being almost entirely yellow and with the wing spot faint, and therefore atypical for a clusiid, *C. flava* is probably often not recognised in the field. In fact it is a frequent species in the south.

Paraclusia tigrina (Fall.) is one of our more boldly marked picture winged flies and may easily be assumed to be a trypetid or otitid, but for its habit of sitting on dead wood. The best situation is a patch of barkless dead wood on the trunk of a large live beech tree, where specimens may be found sitting inconspicuously in August and September. This used to be thought of as a great rarity since it does not seem to occur in the well known ancient forests. However, over recent years it has been found in several localities in southern England, as well as in South Wales, on rather isolated large trees within hedgerows and narrow strips of woodland.

My thanks are passed to Mr. B. Cogan for letting me examine material from the Verrall/Collin collection which he had on loan from the Hope Department, Oxford.

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BENHS Meeting 10.ix.1981.—*Exhibits.* Mr. A.E. STUBBS: The hoverfly *Didea alneti* found at Loch Loy (Culbin Sands, Nairn) on 5th August 1981. It was flying over lake-side marsh where alders are present, resembling its habitat where the exhibitor had seen it in Finland. The pale markings were turquoise blue (as in Finland) but they had faded to pale apple green as in old collections. This would seem to be the first recent record, and the first for Scotland. Lt. Col. A.M. EMMET: (1) Eight reared specimens of *Scythris dispersella* (Hübner) from Stoke Ferry, Norfolk, emerged 27.vii-3.viii 1981. (2) Eight specimens of *Ypsolopha lucella* (F.) captured at Barton Mills, Suffolk on 14 and 27.vii.1981. They include a male, which is very rare. (3) Mines and living larvae of *Parornix torquillella* (Zell.) and *P. finitimella* (Zell.) to show the distinguishing characters. In *A Field Guide to the smaller British Lepidoptera*, the exhibitor stated that the early stages had not yet been differentiated and attributed the mine of *P. torquillella* to *P. finitimella*. The purpose of the exhibit was to correct this mistake and to demonstrate the differences. Rev. D.J.L. AGASSIZ: Larvae of *Enicostoma lobella* D. & S. found on blackthorn from East Tilbury, Essex. Mr. P.A. SOKOLOFF: Old honeycomb from an abandoned hive infested with *Achroia grisella* F. the Lesser Wax Moth. Over 200 moths had emerged from a single comb. A living example of the moth was also shown. The comb originated from Orpington, Kent, and the moths emerged between mid-August and early September.

Communications. Mr. M. HADLEY reported five examples of *Lithosia quadra* (L.) at Polruan, Cornwall. Mr. J.M. CHALMERS-HUNT: a Clouded Yellow (*Colias croceus* Geof.) had been seen in Ashridge, Cornwall on 17.8.81 and there was a report of approx. 90 individuals of this species seen in a quarry in Warwickshire, including the pale female form. He also reported that an example of *Acleris literana* (L.) had been seen in Montgomery but not taken.

Lecture. The Geological History of Insects, by Mr. E. Jarzembowski.

BENHS Meeting 24.ix.1981.—The President welcomed Dr. Georgina Bryan and Dr. Stephen Menken from the Netherlands and Mr. Moros from Spain.

Exhibits. Mr. P. CALDERARA: (1) A web of young larvae of *Lymantria dispar* (L.) preparing to over-winter on a branch of the evergreen *Arbutus* in a remote part of the Alpes Maures (Var). This was noticed when searching for ova of *Charaxes jasius* (L.) the second brood of which has been unusually abundant this year. The last major infestation of *L. dispar* in this area was in 1975 when it consumed most foliage in an omnivorous manner but he had never found it on *Arbutus* before in the last 15 years. (2) An example of *Lampides boeticus* (L.) from Kenya. The butterfly was found in the snow near one of the summits of Mount Kenya. Mr. David C. Edward who sent the butterfly wrote "The butterfly was found in the snow at 16000 feet on the snowfield that runs

down the Lantana, the lowest at 16355 feet of Mount Kenya's three peaks. I think it was about 250 feet from the summit. Mount Kenya rises from hot sweaty farmland at 7000 feet. From 8000 to 10500 feet it is tropical rain forest. From 10500 to 12500 feet it is boggy heathland, a few flowers but not many butterflies. Above 14000 feet it is basically bare rock. These figures are approximate and from my memory of the terrain I'm sure that the butterfly would have come from farmland at 7000 feet as I did not see any "blues" above 8000 feet." Dr. A.A. ALLEN: A female *Heterogamus dispar* (Curtis) (HYM, Braconidae) captured by sweeping at Ashcombe, Devon, 8.viii.1981. The species – the host of which is still unknown – appears to be exceedingly rare in Britain, there being records of only 3 or 4 specimens. (The most recent capture prior to this example appears to be the insect secured by the present exhibitor at Littlehampton, Sussex 2.ix.1978). Lt. Col. A.M. EMMET: Living specimens of *Mompha nodicolella* Fuchs reared from a gall in a stem and a seedpod of rosebay willowherb (*Epilobium angustifolium*), the latter constituting a hitherto unrecorded method of feeding. The moths were reared from larvae collected in the East Ham Churchyard Nature Reserve on 21st August on a visit made in the company of the Rev. D.J.L. Agassiz. This visit, the second to be made this year, established that the species is bivoltine. Although larvae were obviously plentiful since seven were found crawling on tombstones, galls of the second generation were scarce and confined to small, late-formed branches in the flowerhead. Agassiz was the first to notice small holes in the seedpods which, when opened, were found to contain larvae; no gall is formed in the pods. The larvae were extremely abundant and from about ten flowerheads 42 moths and 20 parasites emerged. Gall-feeding larvae of both generations appear to be immune from parasitisation. Mr. R. FAIRCLOUGH: (1) A specimen of the Mottled Umber Moth *Erannis defoliaria* (Clerck) which appeared in his trap three nights ago. He regarded this as a December – January species. (2) The *Acleris literana* (Linn) mentioned by him at the last meeting from Sussex which is form *squamana* (F.). (3) An *Amblyptilia punctidactyla* (Haw.) caught 23.ix.81 in Sussex. The greenish colour as opposed to brown in the wings distinguishes this from *A. acanthadactyla* (Hübner). (4) *Phyllocnistis saligna* (Zell.). He showed mines of this species two years ago, but bred very few as twigs of *Salix purpurea* shrivel when placed in water. He was pleased to find the moth in Surrey this time and to succeed by collecting the cocoons on the leaves which were placed in sandwich boxes with plenty of greenery. He found cocoons also for the first time on another species of *Salix* resembling *fragilis*.

Membership: Messrs. G. Mulford, J.G. Whiteside, P.D. Mainwaring, N.E. Turner and R.D.G. Barrington were elected.

Communications: Mr. K. EVANS reported the arrival at his Addiscombe, Surrey trap of a ♂ *Rhodometra sacraria* (L.), The Vestal, on the night of 7.ix.81 and again on 8.ix. Both were in immaculate condition. The crosslines on both examples tended to be brown in colour and not pink. Mr. S.N.A. JACOBS gave it as his opinion that the colour of the cross lines was due to the melanin content which, according to Dr. Corbett, was dictated by the length of time spent in the pupal state. Mr. R.F. BRETHERTON reported on the attendance of the migrants *P. meticulosa* (L.) and *A. gamma* (L.) at his Bramley, Surrey trap and drew attention to the population explosion of *Omphaloscelis lunosa* (Haw.) as no less than 42 examples arrived at his trap on night of 23-24.ix.81. Dr. A.A. ALLEN reported that some brown larvae of *Cyclophora porata* (L.) had changed colour to green in the penultimate instar. He felt that this was an unusual phenomenon as in most species having two colour forms in the larvae the tendency was for the greens to change to brown.

Lecture: Animal/flower symbiosis, by Dr. B.M.G. Jones.

BENHS Meeting 8.x.1981.—The President announced the deaths of Mr. W.E.G. Collinson, Mr. F.H. Edwards, Mrs. M.J. Frohawk and Lt. F.W. Smith. He welcomed Dr. Becker of The Ministry of Agriculture, Brazil.

Exhibits. Mr. A.E. STUBBS: a hoverfly, *Lejops vittata* (Mg.) taken at Romney Marsh 20.vii.81. It is the first recent record of this very rare species beyond the Thames Estuary. Mr. M. HADLEY: A new book *A History of the Butterflies and Moths of Sussex* by Colin Pratt. Lt. Col. A.M. EMMET: (1) A leaf of red clover (*Trifolium pratense*) showing mines of *Parectopa ononidis* (Zeller). This species seems to have years of special abundance and this is the first such year since 1975. It occurs mainly on chalk downland. The larva over-winters in its mine, starts to feed again in late February and pupates in late March or April. The larvae readily change leaves. Mines are easy to find in autumn but much harder in spring. The best plan is to collect in the autumn and overwinter the larvae on a potted plant out of doors. (2) A cocoon of *Leucospilapteryx omisella* (Stainton). The larva in question was extracted from its mine to see if it was capable of entering a fresh leaf. It evidently could not do this and after wandering about for a week it spun up. Larvae of this species are pale yellow-green but turn orange-crimson when full-fed. This larva was still yellow-green when it spun up. The cocoon is normally ochreous but this cocoon is white, which is the colour of silk spun by a half-grown larva. The cocoon is usually opaque but this one is transparent and it is possible to see that pupation has taken place successfully and that the pupa is alive. The colour change of the larva and of its silk is therefore apparently dependent on the larva being fully fed and not on impending pupation. Mr. I.R. HUDSON: A specimen of *Ammophila sabulosa* (L.) (HYM Sphecidae) found covering up a nest burrow on heathland at Browndown, Gosport, Hants 29th July 1981. On digging down 5-8 cm a large hairy caterpillar was found. References he had read indicate this species to prefer non-hairy hosts.

Communications. The President stated that 290 acres of Holton Heath and the adjacent foreshore of Poole Harbour in Dorset had been declared as a National Nature Reserve. Mr. J.M. CHALMERS-HUNT reported the appearance of the Monarch Butterfly, *Danaus plexippus* L. in Devon and Cornwall. He also stated that, simultaneously with this migration, *Cynthia virginienensis* (Drury) had been reported from S. Wales. Lt. Col. A.M. Emmet stated that Mr. J.A.C. GREENWOOD had taken *Rhodometra sacraria* (L.) at his trap in Sussex. Mr. K.G.W. EVANS reported a third *R. sacraria* (L.) at his Addiscombe trap reported at the previous meeting, a barren female on 26.ix.81. He also found a male *Mythimna unipuncta* (Haw.) at Addiscombe on 1.x.81.

Lecture. *Desert Insects*, by Prof. J.L. CLOUDSLEY-THOMPSON.

BENHS Meeting 12.xi.1981.—**Exhibits.** Lt. Col. A.M. EMMET: tenanted larval cases of *Adela croesella* (Scopoli) (Lep.: Incurvariidae). The early stages of this species are little known in Britain. The larva was not described in *The Moths & Butterflies of Great Britain & Ireland* Volume 1. No example of the case was available for figuring and the description of it given in the text was in part inaccurate. The case is, in fact, made of silk which is then coated directly with particles of soil, without the incorporation of any leaf material. Meyrick gives brief but correct descriptions of the larva and case. The material shown was collected from the ground at Icklingham, Suffolk on 2.xi. under privet, the supposed foodplant of the young larva. The larvae are reported to feed on leaf-litter in later instars. Those exhibited appeared to be either fully fed or in winter diapause, since from the time of collection they had rested with their cases half buried in soil without showing any inclination to feed, returning to this position if disturbed. Adults taken at the same locality on the 1st of June 1981 were also exhibited. Mr. & Mrs. T.G. HOWARTH: a fully grown larva of *Agrius convolvuli*

(L.), the *Convolvulus* Hawk, on behalf of our member Mr. G. CROSS. A worn female brought to him at Shipton Gorge near Bridport, Dorset on 25.ix laid 30 ova and from these 20 larvae are now either nearly fully fed or have buried themselves prior to pupation. Rev. D.J.L. AGASSIZ: the British species of the *Oegoconia quadripuncta* (Haw.) group, comprising three species, not two as in our previous lists. Further research is required before the names to be applied to them can be stated with certainty. Dr. A.A. ALLEN (1): Two recently determined male specimens of *Heterogamus dispar* Curtis (Hym: Braconidae) caught 16.viii.1980, Littlehampton, Sussex and 8.viii.1981, Ashcombe, Devon, both beaten out of hawthorn. The host is unknown. (2) A female *Apanteles chrysis* Nixon (Braconidae) bred 17.viii.1981 from *Aspilapteryx tringipennella* (Zell.) (Lep: Gracillariidae) from a mine on *Plantago* taken 22.vii.1981 near Dawlish, Devon. The parasite seems rare; the exhibitor had collected many mines of the host on several occasions and only moths had emerged. From around 50 mines collected on this occasion, only the one parasite was bred. Dr. M.R. Shaw (pers. comm.) while never having obtained any *Apanteles* from the host, had frequently encountered a species of *Microgaster*.

Communications. Mr. R.F. BRETHERTON reported on insect migration and said that 1981 had been the worst of the last 9/10 years for migration records. However, September had been the best month there having been records of the arrival of *Danaus plexippus* (L.) on 24/25.ix.81 and, latterly, an invasion of *Herse convolvuli* (L.). But he was puzzled because Meteorological Office records over that period showed that the prevailing winds had come from N. Africa and the Canaries yet there had been records of the arrival of some half dozen species of N. American birds. There had been almost no migrant records for October. On the previous night, 11.xi.81, Mr. Bretherton's Bramley, Surrey trap had taken 34 moths of 10 species. About half of the moths were *Brachionycha sphinx* (Hufn.). There were no migrants.

Announcements. Mr. G. Prior appealed for volunteers to lead Field Meetings. [This is a recurring need in all parts of the country. — Ed.]

Exhibition. Mr. K.G.W. EVANS opened a general and lively discussion on the Society's Exhibition at Chelsea Town Hall on 24.x.81 and regretted that demonstrations and massive traffic jams on that day had delayed the arrival of some members for several hours and that some members had even failed to reach the exhibition. Lt.Col. EMMET drew attention with some pleasure at the preponderance of the *micro-lepidoptera* on display. This was a noticeable change of the balance with *macro-lepidoptera* in previous years. Mr. R.F. BRETHERTON remarked that there had been more exhibits of foreign insects this year than usual and that the standard was very high. Mr. R. TUBBS had noticed an increasing tendency for exhibits to tell a story and said that this was a welcome change from great numbers of set specimens devoid of much detail. Mr. M. VENTOM complained of the lack of live insects and felt that more attention should be given to this.

Slides. There followed a showing of very high quality colour slides with appropriate commentary by Dr. A.A. ALLEN, Mrs. F. MURPHY, Mr. T.G. HOWARTH and Mr. A. CALLOW.

BENHS Meeting 26.xi.1981.—*Exhibits.* Mr. A.E. STUBBS: examples of two hoverflies from Finland. *Spilomyia saltuum* (F.) and *Eristalis oestraceus* (L.). Mr. C. HART: (1) a variety of *Amathes c-nigrum* (L.) captured during the summer at Buckland, Surrey. (2) ova of *Lithophane leautieri* (Boisduval) from a moth taken in early November also at Buckland.

Members elected. Miss C.A. Peachey, Messrs. G.F. Arnold, H.E. Beaumont, R.G. Brown, C.M. Buckingham, B. McRitchie, D.A. Oram, C.E. Shepherd, P. Summers, G.D. Trebilcock, and J.B. Warbrook.

Communications. The PRESIDENT stated that the Wildlife and Countryside Bill, 1981 had received Royal Assent and he listed those insects included in Schedule 1. Lt. Col. A.M. EMMET referred to his exhibit at the previous meeting of tenanted larval cases of *Adela croesella* (Scopoli) (Lep: Incurvariidae). He pointed out that the larvae tended to be unusually bulbous at the anal end and felt that larvae of other species of this genus should be examined to see if they also exhibited this phenomenon. Investigators should report their findings to Mr. David Carter of B.M.(N.H.). Mr. R.F. BRETHERTON, reporting on migration, said that Mr. Foster had recorded on 21/22.xi.1981 near Falmouth *Mythimna unipuncta* (Haw.), *Nomphila noctuella* (D. & S.) and the tropical *Tathorhynchus exsiccata* (Led.). He also reported that Mr. Bernard Skinner had taken at Wye, Kent the rare Pyralid, *Euchromius ocella* (Haw.).

Mr. P. CALDERARA drew attention to the almost complete failure of the acorn crop and felt that this would have a deleterious effect on those species which rely on acorns. However, Lt. Col. EMMET thought that this must be a local problem of acorn shortage as he had observed such in plenty at Newlands Corner, Surrey. Dr. D. LONSDALE reported that at Alice Holt Forest, Sussex there had been serious defoliation of the oaks over the last three years and that it had proved even worse in 1981. This, he felt, might be the cause of Mr. Calderara's observation.

Lecture. Mr. C.I. CARTER then gave an illustrated lecture entitled "New Aphid arrivals and their tree hosts in Britain".

BENHS/Royal Entomological Society Meeting 10.xii.1981. – The PRESIDENT, Mr. A.E. STUBBS, welcomed Fellows of the Royal Entomological Society to a joint meeting with this Society. He then introduced four speakers, viz: – Messrs. Ian McLean, Rupert Lees, Peter Hammond and Richard Vane-Wright who all spoke on the subject of "Courtship Behaviour" illustrated with a series of excellent slides. These talks provoked a lively discussion and a number of interesting questions.

The official business of the meeting concluded, members and their guests adjourned for wine and refreshments.

Atlas of butterflies of the London area. – Records are sought for the production of a tetrad Atlas of the Butterflies of the London area by the London Natural History Society, intended for publication in 1986. The society's recording area is a circle of radius 20 miles centred on St. Paul's Cathedral. This circle is defined at intervals by the following places: Tilbury; Brentwood; Harlow; Hertford; Welwyn; St. Albans; Kings Langley; Chorleywood; Chalfont St. Peter; Gerrards Cross; Slough; Egham; Chertsey; Addlestone; Byfleet; Bookham; Redhill; Limpsfield; West Kingsdown and Swanscombe, and contains portions of Essex, Hertfordshire, Buckinghamshire, Surrey and Kent, as well as all of Middlesex.

All records of butterflies are invited for these areas for the following periods: pre-1900; 1900 to 1959; 1960 to 1979; 1980 onwards. The maps will be prepared using tetrads, (two by two kilometre squares), as the basic recording units, and records will ideally include a grid reference, date and other relevant comments.

People who have in the past sent butterfly records from the London area to the late Baron de Worms are invited to resubmit the records to me, since many of the late Baron's notes have gone missing since his death.

It would be helpful, in the case of less common species, if contributors would state any degree of confidentiality they require to be imposed on the records.

Contributions should be sent to me please at the Passmore Edwards Museum, Romford Road, Stratford, London, E15 4LZ. – Colin W. Plant.

LEPIDOPTERA IMMIGRATION TO THE BRITISH ISLES, 1969 TO 1977

by R.F. BRETHERTON

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INTRODUCTION

This article brings together, with short commentaries, records of the Lepidoptera believed to have been immigrant to the British Isles in each of the years 1969 to 1977. No collected annual migration records have yet been published for these years. It is important to fill this gap as far as is now practicable both to preserve continuity of the data and also because some of these years are outstanding, either in the abundance of immigrant species, as in 1969 and 1976, or because of their unusual pattern and species content, as in 1972.

Records of the "scarcer" immigrant species, rather more broadly defined than in previous annual migration reports, are usually given in full, arranged by vice counties with place, date, and original reference; but in the case of previously published records authors' names have been omitted. For certain species in years of their greatest abundance the records have been summarised only. Species which are more or less frequent immigrants but also established residents have been marked with an asterisk; for these records have been included only of examples which are believed to be probable immigrants on grounds of locality, appearance, date, or association with other immigrant species; there is inevitably sometimes doubt about the true status of some of these. Records believed to result from introduction by human agency or release have not been included.

Records of the dozen most common and regular immigrants are not set out in detail; but their prevalence in each year is referred to in the commentary. These species are *Plutella xylostella* (L.), *Udea ferrugalis* (Hübner.), *Nomophila noctuella* (D. & S.), *Colias croceus* (Geoff.), *Vanessa atalanta* (L.), *Cynthia cardui* (L.), *Macroglossa stellatarum* (L.), *Agrotis ipsilon* (Hufn.), *Peridroma saucia* (Hübner.), *Phlogophora meticulosa* (L.), *Autographa gamma* (L.). A number of resident species which are known or suspected to be immigrant are not listed here because of the difficulty of separating immigrant examples.

Many of the records which are collected here have already been published in the national entomological journals, in reports of local natural history societies, or in special works on counties and other areas. For these records source references are given, but for reasons of space without the names of the authors of each record, except in a few special cases; as far as practicable the earliest published record has been used. Many unpublished records have been given to me by personal contributors, whose names are mentioned, and for whose help I am very grateful. I am also much indebted to Mr. R.A. French of Rothamsted Experimental Station for his full notes for 1969 and for many records, not otherwise available, which have come to him for some later years. Individual records refer to single examples unless a number is given; for nocturnal species capture or observation at light is intended unless other means are stated, and the date given as far as possible refers to beginning of the night in question. The following abbreviations have been used:—

AES Bull.	Bulletin of the Amateur Entomologists' Society
BENHS	Proceedings and Transactions of the British Entomological and Natural History Society
ER	Entomologist's Record and Journal of Variation
INJ	Irish Naturalists' Journal
Berw. NC	History of Berwickshire Naturalists' Club

Derbys. ES	Proceedings of the Derbyshire Entomological Society (<i>The Gnat</i>)
DNHAS	Dorset Natural History and Archaeological Society: Annual Reports
Hast. Nat.	Hastings and East Sussex Naturalist
Herts. NHS	Transactions of the Hertfordshire Naturalists' Society
Lancs. & Chesh. ES	Annual Reports of the Lancashire and Cheshire Entomol- ogical Society
L.N.	London Natural History Society: Biennial reviews of London Lepidoptera, by Dr. C.G.M. de Worms (reprints from <i>The London Naturalist</i>).
Macrolep. Glos.	Proceedings of the Cotteswold Field Club, 1973: 151- 173: The Macrolepidoptera of Gloucestershire, Supple- ment 3, by Austin Richardson.
C-H Kent	Chalmers-Hunt, J.M., 1981. The Butterflies and Moths of Kent, vol. 3.
C-H Man.	Chalmers-Hunt, J.M., 1970. The Butterflies and Moths of the Isle of Man.
Christie Lomond	Christie, E.R. & I.C., 1980. Moths of East Loch Lomond- side.
AME SmM Essex	Emmet, A.M., 1981. The Smaller Moths of Essex.
Croydon Survey	Evans, L.K. & K.A.G., 1973. A Survey of the Macro- lepidoptera of Croydon and north east Surrey.
Essex Guide.	Firmin, J., 1975. A Guide to the Butterflies and larger Moths of Essex.
BG Lep. Hants.	B. Goater, 1974. The Butterflies and Moths of Hampshire.
CRP Sx.	C.R. Pratt, 1981, A History of the Butterflies and Moths of Sussex.
S-B Brecon	Sankey-Barker, J.P., 1978. Butterflies and Moths of Breconshire.
RISR	Taylor, L.R. & French, R.A., 1969-1973. Rothamsted Insect Survey reports.

These annual lists are certainly far from complete. The author would much welcome any further records of the scarcer immigrant species for the years 1969 to 1977.

1969

1969 was a very good year for immigrants. Of the scarcer species 34 of those which are immigrant only were reported, and immigrant examples of 7 resident species were noted. The records included one species, *Crenoplusia accentifera* (Lefebvre), new to the British list; three, the Fritillary *Pandoriana pandora* (D. & S.), the Noctuids *Dysgonia algira* (L.) and *Hypena obesalis* (Treits.), which are second British records; and two specimens of *Cryphia raptricula* (D. & S.), of which only two were previously known. The occurrences of *Nymphalis antiopa* (L.) (4), *Daphnis nerii* (L.) (4), *Catocala fraxini* (2, one of them in Shetland), *Macdunnoughia confusa* (Steph.) (2, one on Orkney), *Eublemma ostrina* (Hübner.) (2), and singles of *Argynnis lathonia* (L.), *Protoschina scutosa* (D. & S.), *Chrysodeixis chalcites* (Esp.), and an immigrant *Tristateles emortualis* (D. & S.) are particularly noteworthy. The scarcer *Pyrales* were represented by *Euchromius ocella* (Haw.) (1), *Uresiphita limbalis* (D. & S.) (5), *Diasemia ramburialis* (Dup.) (4), and *Palpita unionalis* (Hübner.) (13). The Geometrid *Cyclophora puppillaria* (Hübner.) (25) and the Noctuid *Diachrisia orichalcea* (F.) (9) both made the largest invasions yet known. Singles of *Scopula rubiginata* (Hufn.) in East Kent and Dorset, and *Photedes fluxa* (Hübner.) in East Kent, far from the areas of residence in England, were probably short distance immigrants across the

Channel. Most of the other scarce and semi-scarce immigrants were recorded in larger numbers than in earlier years of the decade, *Spodoptera exigua* (Hübner) (over 200) and *Orthonama obstipata* (F.) (over 450) being especially prominent. There were, however, some exceptions: *Agrius convolvuli* (L.) (22), *Acherontia atropos* (L.) (c.20), *Mythimna albipuncta* (D. & S.) (4), *Heliothis peltigera* (D. & S.) (2), *Rhodomestra sacraria* (L.) (c.15) all made rather poor showing in the records.

Among the usually common butterflies, *Cynthia cardui*, with some 2,000 reported, was probably commoner and more widespread than in any year since 1952. After a few arrivals in Ireland in early May, there were large invasions of southern England from May 14 to early June, with good spread later as far as Orkney. From these there was much local breeding, especially in the south, which added to the large number of immigrants which arrived in early August, mainly near the north east coast. About 200 were counted in fields at Gartlea, Dumbartonshire on August 7 and 8, apparently on passage further west. Smaller invasions at the end of the month, and more local breeding, kept the species generally widespread and in many places common through September and October, with several accounts of southward flights near and from the coast. Records ceased suddenly with the onset of cold weather in the first week of November.

Vanessa atalanta began to arrive in small numbers in late March and April, and some 60 were reported in May. From August numbers increased until October, apparently more as a result of local breeding than of further large immigration. There were then, as with *C. cardui*, reports of southward flights, but few were seen in November, the last being from the Lizard, West Cornwall, on November 26th. With the help of a warm summer, this nearly resident species had its best season since 1964.

Arrivals of *Colias croceus* also began early in both England and Ireland from April 7 to early June. Later there was a small immigration about July 22, and others to Devon and Co. Cork in August; it was probably the offspring from these which brought the October numbers up to over half the annual total of 550, well above the average for the decade. Of the much rarer *Colias hyale* (L.) 18 were reported, of which 15 were from three localities in Ireland; but this total must be subject to some doubt because of possible confusions with pale females of *C. croceus f. helice*. Baynes (1964) considered that there were no reliable records of *C. hyale* in Ireland since 1868.

All of the usually common immigrant moths including *Macroglossa stellatarum*, *Peridroma saucia*, *Phlogophora meticulosa*, *Autographa gamma*, *Nomophila noctuella* and *Udea ferrugalis* appear to have been in larger numbers and more widespread than usual.

A. gamma was especially prominent. A few arrived in April, and over 500 were reported in May; in late July and early August it became extremely abundant both by day and by night. The invasion about August 2 must have been enormous: on that night over 400 were trapped in Orkney, an estimated 6,000 at Thurlestone, South Devon, and, far inland, 66 at Bramley, Surrey and 200/300 at Steeple Barton, Oxon. The results of local breeding from earlier arrivals no doubt contributed heavily later, but there were indications of further influxes about September 19 and October 7 and 19. The range extended to Shetland in August, and the last was seen in Oxfordshire on December 13.

N. noctuella also had a record year, beginning in January and again in May and continuing until November 12. Local breeding may have contributed to its abundance; but it is curious that the finding of wild larvae in Britain has never been precisely described. Several recorders, even some far inland, had more than 100 in their light traps on nights in September and October, and the total for year of over 3,000 was the highest since 1952. Swarms of probably immigrant

P. meticulosa were also noticed, not only on the south coast but also in Oxfordshire, where about 1,000 were noted on October 12.

In 1969 the arrivals of waves of immigrant Lepidoptera were more frequent than usual, and the records of their contents often overlapped. Many species also began to arrive early in the season and in a generally warm summer locally bred offspring of these became numerous from July onwards. For these reasons it is difficult to identify the precise timing and species content of separate influxes or to trace their probable origins. But a rough sequence may be described as follows.

There was a small, certainly very long distance, influx which included *E. ocella* and *N. noctuella* as early as January 21-23. From late March to early May there were several small arrivals, mainly of the common butterflies and of *A. gamma*, and from May 12-14 and again about May 20-28 at least seven species of scarcer immigrant moths and many *C. cardui*. These appear to have come from the south west, probably from south Spain or north Africa. In June and the first half of July there were isolated records of several scarce species which probably came from France. Mass immigration from the south west began again in late July and from August 2/4. From August 2/9 several species known to be resident only elsewhere in Britain were reported in Kent and Dorset: these probably came across the Channel from France. From August 19-24 there was an influx across the North Sea which included *E. occulta*, *N. antiopa*, *P. scutosa*, and many *N. noctuella*.

September was distinguished by at least two large invasions, including three species new or almost new to British list, probably from far to the south or south west, as well as by examples of *C. fraxini* in Suffolk and Shetland on September 18-19, presumably from Scandinavia. In all about 20 of the scarcer species were reported.

In October the migratory season reached its height with apparently almost continuous arrivals in large numbers, probably of south western origin in Iberia or North Africa. Besides the scarcer migrants usual at this time of year, there were records of no less than 25 *C. pupillaria*, two *D. nerii*, and one *C. chalcites*: some 20 scarcer migrant species in all. There were also high migratory peaks of almost all the common species, some of them much reinforced by local breeding. There were many survivors in much of November, and of *A. gamma*, well into December; but there were no clear indications of fresh arrivals after the end of October.

Scarce Immigrants, 1969

Euchromius ocella (1) HANTS S. Bursledon 23.1 (BG Hants: 175).

Uresiphita limbalis (5) CORNWALL W. Lizard 13.9 (ER 81:308). DEVON N. Chulmleigh 13.8 (ER 81:308). SOMERSET S. Selworthy 13.10 (ER 82:30). MONMOUTH. Usk 13.10 (BENHS 4:11). CAERNS. Bangor 17.10 (Ent. Gaz. 22:111).

Diasemiopsis ramburialis (4) CORNWALL W. Rosewaryn 20.10 (per French). DEVON S. Slapton 25.10 (G.A. Cole, pers. comm.). HANTS S. Minstead 17.10 (ER 82:138). PERTHS S. Aberfoyle 21.10 (D.L. Coates per I.C. Christie: 1st Scottish record).

Palpita unionalis (16). CORNWALL W. Lizard 13.9 (ER 81:308). CORNWALL E. Looe 8-20.10, nine (per French). DEVON S. Slapton 19.10, 22.10 (BENHS 4:11). DEVON N. Chulmleigh 13.8 (ER 81:307). HANTS S. Minstead 13.10 (BG HANTS:194). ESSEX S. Bradwell-on-Sea 17.7 (per French). WESTMORLAND. Beetham 27.10 (BENHS 4:11).

**Dioryctria abietella* (*splendidella* auct) (1) ESSEX S. Bradwell-on-Sea 17.7 (per French).

**Papilio machaon* (1) SUFFOLK E. Walberswick 14.8 (ER 82:87).

Colias hyale (c.18) DEVON S. Princetown 23.7; Plymouth 23.9 (per French). SUSSEX E. Fairlight, 22.9 (per French); Peacehaven n.d.; Hastings n.d. (CRP. SX:301). Co. CORK. Cape Clear Is. 21.8, 22.8, 10.10; Cloyne 29.9, female INJ 16:291: "at both places closely examined and observers considered them to be *C. hyale* and not *C. croceus* f. *helice*. In addition, Co. WATERFORD. Tramore 29.10, some 10 pale *Colias* seen, some at least of which were thought to be *C. hyale*."

Pontia daplidice DEVON S. Torquay 2.6. BUCKS. Slough 31.8 (per French).

**Nymphalis polychloros* DORSET. Winspit 28.6 (DNHAS 91:448). KENT E. Acrise August (C-H Kent 3:221). ESSEX N. The Naze 21.9 (Essex Guide:31).

Nymphalis antiopa (4) SUSSEX W. Washington 24.10, on rotting apples (D.A. Odd, notebook). WESTMORLAND. Burton 14.10, in garden (ER 82:64). STIRLINGS. Rowardennan Ben Lomond 21.8 (ER 81:281). Co. ANTRIM. Belfast 4.8, in garden (ER 81:293).

Argynnis lathonia (1) MERIONETH. Tal-y-Wern 3.9, 3 p.m. over brambles (ER 81:295).

Argynnis pandora (1) DORSET. Durdle Door 13.7, on thistle (C.J.P. Samson, A.E.S. Bull. 29:108).

Danaus plexippus (2) NORFOLK E. Ditchingham 7.9 (per French). HANTS S. Winchester 9.9 (per French).

Cyclophora puppillaria (25) DEVON S. Slapton 13, 21, 22.10 (ER 82:102); Cullompton 19 & 24.10 (ER 82:100). SOMERSET N. Weston-s-Mare 19.10 (ER 82:100). WILTS S. Trowbridge October (French). WILTS. N. Wroughton 17.10 (ER 82:90). HANTS S. Minstead 12.10 (ER 81:335); Bursledon 16.10 (BG Hants: 254). HANTS N. Martyr Worthy 7, 13, 17.10; Micheldever 22.10; (ER 83:115); Watts Common 22.10 (ER 82:101). KENT W. Lee 20.10 (LN 49: 84, 88). SURREY. Nutfield 8.10 (Croydon Survey: 305); Bramley 13.10, five (ER 82:100). MIDDXX. Totteridge 22.10 (49:84). OXON. Shillingford 19.10 (Ent.Gaz. 21:64). NOTTS. near Nottingham 26.10 (D.H. Sterling, pers comm.).

**Scopula rubiginata* (1) DORSET. Studland 7.8, one worn at light (ER 82:311).

Rhodometra sacraria (c.15) CORNWALL W. Rosewarne 1.11 (per French). CORNWALL E. Looe 5.6, 24.10 (per French). DEVON S. Slapton 12.7, 8.10, two (per French); Brixham 13.9, 18.10; Thurlestone Sept. (per French). SUSSEX W. Midhurst 19 & 24.10 (CRP Sx: 308); Chichester 21.10 (CRP.Sx: 308). SURREY S.W. London mid 10 (per French). ESSEX S. Rainham 2.9 (per French). SUFFOLK E. Walberswick 7.10, f. *sanguinaria* (H.E. Chipperfield, pers. comm.). STIRLINGS. Aberfoyle 1969, n.d., (D.L. Coates per I.C.Christie).

Orthonama obstipata (over 500). CORNWALL May 25 (1), July 4 (1), August (1), September (7), October (38). DEVON. May 12 (1), July (15), August (5), September (42), October (42), November (5). SOMERSET May 13 (3), August (6), September (10), October (10). DORSET August (1), September (1), October (2). HAMPSHIRE May 21 & 25 (2), June 30 (1), July (30), August (44), September (4), October (63), November (4). Total trap counts at Martyr Worthy 60, at Minstead 75. SUSSEX October (4). KENT July (7), August (1), September (1). SURREY July (7), August (7), September (12), October (11). ESSEX May 12 (1), July (1), August (4), September (5), October (22). November (1). HERTS July (2), August (1), September (2), October (8). MIDDXX. July (1), November (1). BERKS. August (1). OXON. July (1), October (7). SUFFOLK Norton July (3), September (1), October (c.5). BEDS. July (1), September (1), October (4). HUNTS. May 15 (1), July (1), September (1), October (5). NORTHANTS. November 4 (1). GLOS. September (1), October (4). MONMOUTH. July (2), September (1), October (7). HEREFs. October (1), SALOP October (2). MERIONETH. July (1). CAERNS. August (1), October (2). LINC's. September (2), October (3). LEIC's. October (1). DERBYs. September (2). WESTMORLAND

October 19 (1). YORKS. September (3), October (3). INNER HEBRIDES September (1), October (2). Co. DUBLIN July (1), October (1).

Agrius convolvuli (19 and two pupae). DEVON S. Culmington 19 & 27.9; Sidmouth, 4.10 (per French). DEVON N. Drayton Buckleigh 13.10 (per French). SOMERSET N. Weston-s-Mare 10.10 (ER 81:30). HANTS S. Bournemouth 17.10 (per French); Bursledon 22.10 (I. Watkinson per Goater). ESSEX S. Bradwell-on-Sea, 17 & 29.9 (per French). SURREY. Camberley 18.10 (ER 81:327). SUFFOLK E. Saxmundham 16.8 (per French); Walberswick 14.10 (ER 82:87); Gt. Bealings, mid 8 (Suff.N.H. 15:138); SUFFOLK W. Bury St. Edmunds 8.10 (per French). NORTHANTS. Maidwell 4.9, two pupae (ER 81:329). CAERNS. Penrhos 1.11 (Ent.Gaz. 22:112). ANGLESEY Holyhead 11 or 18.10 (Ent.Gaz.22:112). INNER HEBRIDES Canna 19.9 (ER 81:324). ORKNEY Kirkwall 15.8, & November, found dead (Ent.Gaz. 21:100).

Acherontia atropos (12, 1 larva, 2 pupae). DEVON S. Torquay 20.9 (ER 82:151); Babbacombe and Brixham, adults, brought to Torquay Museum 13.11; Barton, larva, 18.8. KENT W. West Wickham 7.10, one found dead (ER 81:336). SURREY Norbury 14.10; Walton-on-Thames July (LN 49:84). GLOS S. Nailsworth 19.9 (Richardson, Macrolep. Glos. Supp. 3:158). NORTHANTS, Finedon 14.10, two pupae (ER 81:329). CHESHIRE. Upton 5.10 (ER 82:58). NORTHUMBERLAND N. Rochester 24.9 (per French). ABERDEEN S. Aberdeen 24.9 (ER 86:39). Co. CORK Ballydehob 12.10; Ballycotton 20.10 (INJ 16:293).

Daphnis nerii (4) CORNWALL E. nr. Saltash 2.8 (Ent.Gaz. 21:32). DEVON S. Exeter 7.8 (per French); Westward Ho! 11.10 (per French). YORKS. v.c. 62. Baildon 8.10 (BENHS 3:17).

**Eurois occulta* (4) W. LOTHIAN. Winchburgh 19.8. INVERNESS E. Newtonmore 23.8 (BENHS 5:115). ORKNEY. Scorradales two, light grey (Ent.Gaz. 21:100).

Mythimna albipuncta (4) KENT W. Lee 8.8 (C-H Kent 3:246). SURREY. Tilford 16.8 (G.M. Haggett, per comm.); Leigh 14.9 (ER 82:31). SUSSEX W. Arundel 1969, n.d. (CRP Sx: 134).

Mythimna vitellina (45). CORNWALL E. Looe 20.5, 13.15, 16.9, 5/17.10 five (per French). DEVON S. Churston Ferrers late 8; Colyton 14.9; Slapton 1.6, 9/28.9 (13), 5/29.10, twelve; Sidmouth 4/14.10; (per French). DORSET Studland 11.10 (J. Leech, pers. comm.). HANTS S. Minstead, 13.16.9 (per French). HANTS N. Micheldever, September; Martyr Worthy, 10.10 (per French). OXON. Steeple Barton, 17.9 (ER 82:139). HEREF. Ledbury 18.10 (per French).

Mythimna unipuncta (33). CORNWALL E. Looe 12.9, 5/25.10, (25) (per French). DEVON S. Tavistock 6.10; Slapton 10.20, 22.28.10; Brixham 12.10 (per French). SUFFOLK E. Gt. Bealings 29.10 (Suff. N.H. 15:223).

Mythimna loreyi (1) CORNWALL E. Bodinnick October (per French).

Cryphia raptricula (2). KENT E. Worth, 9.8; Sandwich, 9.8 (T.W. Harman, BENHS 3:18, pl.2; c-H Kent 3:256).

**Photedes fluxa* KENT E. Sandwich Bay, 11.8 (C-H Kent 3:356).

Spodoptera exigua (c.220). CORNWALL (11), first Rosewarne, 20.5. May (1), Aug. (7), Sept. (1); Oct. (3). DEVON (12), Slapton 11.5; June (1), July (14), Aug. (12), Sept. (1), Oct. (5). SOMERSET (15), May, Bath, 13.5; June (1), Aug. (5), Sept. (2). DORSET (2), Aug. HANTS. (62) May (3), Southampton 12.5; June (2), July (23), Aug. (14), Sept. (12), Oct. (8). SUSSEX (2). July (1), Midhurst 19.7; Oct. (1). KENT (7). Aug. (7), Worth, 6.8; Sept. (3), Nov. (1), East Malling, 25.11. SURREY (10). July (1), Bramley 21.7; Sept. (4), Oct. (4), n.e.d. (1). ESSEX (14). May (1), Bradwell-on-Sea, 14.5; July (3), Aug. (3), Sept. (2), Oct. (2), n.e.d. (5). HERTS (1), Sept. OXON. (6): May (1), Steeple Barton, 31.5; July (2), Aug. (1), Oct. (1). SUFFOLK (11). July (4), Norton, 18.7; Aug. (3), Sept. (3), Oct. (1). GLOS. (2). July (2), 28.7. MONMOUTH (1). Oct. (1),

Usk, 3.10. CARDS. (1) May 24. LINGS (1), Aug. YORKS, (3). July (1), Emley, 27.7; Aug. (2). WESTMORLAND (1). Oct. (1). Beetham, 24.10. LANCS (1). Oct. (1), Leighton Moss, 23.10. Co. KERRY (1) Sept. 1, Dingle, Co. DONEGAL (2) Aug. (1), Kerrykeel, 10.8; Oct. (1).

Helicoverpa armigera (16). CORNWALL E. Looe, 5,7,20.10 (per French). DEVON S. Brixham 13.9 (per French); Slapton, 6.10 (G.A. Cole, pers comm.). HANTS N. Martyr Worthy 7.10 (per French). SUSSEX W. Chichester 12.10 (G.C. Stubbs, pers comm.). SURREY. Bramley 3.8 (R.F. Bretherton); Virginia Water 10.10 (ER 82:29). ESSEX S. Ongar 14.10 (Essex Guide: 61). SOMERSET N. Weston-s-Mare 22.10 (ER 82:30). HERTS. Totteridge 13.9 (per French). OXON. Steeple Barton 26.5 (ER 82:139). STAFFS. Darlaston 30.6 (per French). WESTMORLAND Beetham 22.10 (ER 82:136). INVERNESS E. Newtonmore 18.10 (ER 82:42).

Heliothis peltigera (3) DEVON S. Slapton 2.10 (per French). DEVON N. Chulmleigh 19,22.7 (per French).

Protophila scutosa (1) SURREY Holmbury St. Mary 24.8, on heather (P.J. Renshaw, ER 81:335).

Eublemma ostrina (2) HANTS N. Martyr Worthy 15,23.5 (BENHS 3:17).

Chrysodeixis chalcites Esp. (1) CORNWALL E. Looe 25.10 (per French).

Ctenoplia accentifera (1) KENT W. Halstead 10.9, in trap (T.J. Dillon, ER 82:149). First British record.

Trichoplia ni (2) KENT E. Willesborough 7.8 (C-H Kent 3:260). PEMBS. St Ishmaels 8.8 (per French).

Diachrysa orichalcea (10). CORNWALL W. Lizard 13.9 (ER 81:308). DEVON S. Sidmouth 4/14.10 (per French); Slapton 20.10 (ER 82: 102); Chulmleigh 13.8 (ER 81:307). DORSET Studland 8.10 (S. Coxey, pers comm.); Sherborne mid 10 (per French). HANTS S. New Milton 9.10 (ER 81:307); Minstead 9.10 (ER 81:307). SUSSEX W. Pulborough 18.8 (ER 81:307). OXON. Steeple Barton 22.10 (ER 82:140).

Macdunnoughia confusa (2) SUSSEX E. Wittersham 11.8 (per French). ORKNEY. Scorradaie, 2.8, with 400 *A. gamma* (ER 81:289).

Catocala fraxini (2) SUFFOLK W. Norton 18.8 (ER 81:305). SHETLAND Collafirth Hill, Mainland 19.9, fertile ova (BENHS 3:16).

Dysgonia algira (1) Bradwell-on-Sea 15.9, at light (A.J. Dewick in Essex Guide: 89). Second British record.

Hypena obesalis (1). SURREY. Chobham 14.9, in trap (G.S. Woollatt, ER 81: 336, BENHS 3; pl.2). Second British record.

**Trisateles emortualis* (1). SUSSEX E. Haywards Heath 26.7 (ER 82:30).

1970

The year 1970 was much less favoured by immigrant species than 1969, despite a generally warm summer which helped local breeding by the few species which arrived early in the season. Only 24 scarce immigrant species were reported, of which six are also resident, and their numbers were generally low, except for *Agrius convolvuli* which, with about 60 examples recorded, was widely spread and had a fairly good year. There were, however, important single records of *Pontia daplidice*, *Colias hyale*, *Mythimna loreyi*, *Trichoplia ni*, *Catocala fraxini* and also two of undoubtedly immigrant *Trisateles emortualis*. The most interesting feature was a small invasion of *Danaus plexippus* of which one was reported in late May or early June in Co. Cork, and eight or nine in English southern coastal counties in August and September, accompanied by two *Cynthia virginensis* Drury. Some or all of these may have originated either in North America or in the alternative possible source in the Canary Islands. There were also shorter distance arrivals across the English Channel and south North Sea, which were probably responsible for examples of *Deltote bankiana* (F.) and *Trisateles*

emortualis in late June, and of *Enargia paleacea* (Esp.), and *Margaritia sticticalis* (L.) in August; movements from further north in August and September brought in a number of *Eurois occulta* (L.) and two of the three *Nymphalis antiopa* reported.

Of the common regular immigrants only *Agrotis ipsilon* was in unusually high numbers. These probably were increased by local breeding from immigrants in May and early June, but there were also influxes in late September, when 200 were trapped at Martyr Worthy with other immigrant species on September 28, and also in late October. *Nomophila noctuella*, starting with some arrivals in mid May, built up towards normal numbers late in the year; the other moths were all well below normal numbers, as were *C. croceus*, *Vanessa atalanta*, and *Cynthia cardui*, after fewer than the usual arrivals in May and June, but with several small fresh immigrations in September.

Scarce Immigrants, 1970

**Margaritia sticticalis* (3). HANTS N. Micheldever 7.8 (BG Hants:187. BUCKS. Granborough 7.8 (ER 82:273). WESTMORLAND. New Hutton, 28.8 (ER 83:25).

Palpita unionalis (3). DEVON S. Brixham 15.10 (per French). SUSSEX E. Mitton Street 27.9 (BENHS Exhib.). ISLE OF MAN. Ballakagh, 25.5 (C-H Man:46).

Pontia daplidice SUSSEX E. Seaford 18.8 (per French).

Cynthia virginensis (2). DEVON S. Yelverton 18.9, female caught on buddleia (A.P. Gainsford, BENHS 4:11). DEVON S. Branton Burrows 26.8, one closely seen (B.Goater, Ent.Gaz. 28:54).

Colias hyale (1). KENT E. Sandwich 18.7 (C-H Kent 3:212).

Nymphalis antiopa (3). MIDDXX. South Harrow 31.8, caught (ER 83:153); Osterley August, one seen (AES. Bull. 30:126). BERKS. Sunninghill 6.7 (per French).

Lampides boeticus (1). ESSEX N. Fingringhoe September, on *Hieracium* almost certainly identified but not taken (Essex Guide:35).

Danaus plexippus (8 or 9). CORNWALL W. Ruan Minor August, three or four on buddleia, one later on hydrangea (L.A.Bean in *The Lizard* 1975:24). DORSET Weymouth 29.9 (per French). SOMERSET N. Ashcott end Aug./early Sept. (per French). SUSSEX W. Pagham Harbour Sept., third week (Rayner, Nat.Hist. Pagham Harbour 2:65). Co. CORK. Fota Island end May/early June (per French).

Rhodometra sacraria (16). CORNWALL W. Coverack 7.9 & 10.9 (4), J.A.C. Greenwood, pers. comm. CORNWALL N. St Kew 10.9 (per French). DEVON S. Starcross 22.9; Slapton 26,29,30.9 (per French). SOMERSET S. Selworthy 15.9 (per French). HANTS S. Minstead 11.9 (per French). SUSSEX E. Ringmer, 11 & 13.9 (Ent.Gaz. 28:2). MIDDXX. Queen's Gate, London Oct. (LN. 49:85). NORTHANTS. Oundle 4.6. (per French). PEMBS. Dale 11.9 (per French).

Orthonama obstipata (9). CORNWALL W. Perranporth 16.10 (per French). DEVON S. Cullompton 28.11 (per French). SOMERSET S. Selworthy 29.9 (per French). HANTS S. Minstead 3 & 4.9 (ER 83:100). KENT E. Willesborough 6.8 (C-H Kent:100). HUNTS. Holme Fen 23 & 25.6 (per French). CARDS. Aberystwyth 17.10 (per French).

(*Semiothis signaria*) (1) ESSEX, 20.6 (R. Tomlinson, ER 86:195), locality not disclosed. It has been suggested that this pine-feeding species, resident in south and east France and central Europe, may have been accidentally introduced with forest products. There are no other British records.

Agrius convolvuli (c.60) CORNWALL W. 7.9, 10.9, four in force 8 gale (J.A.C. Greenwood, pers comm.) CORNWALL E. St. Kew 4.9 & 11.9; Bodinnick early 10 (per French). DEVON S. Colyford 28.8, 6.9. (per French); Slapton 20/25.9,

four (G.A. Cole, pers. comm.); Cullompton 10.9, 28.9, 6.10 (per French); Uffculme 26.9 (per French). DEVON N. Chulmleigh 24.9 (per French). SOMERSET S. Selworthy 29.9 (per French). SOMERSET N. Saltford 19.9 (per French). DORSET. Brownsea Is. 23/30.9, six (DNHAS 49-51). HANTS S. Sandy Heath 18.9 (R.A. Watson per BG.); Locks Heath 14.10 (R. Haywood, pers. comm.); Bursledon 22.10 (I. Watkinson, pers. comm.). HANTS N. Martyr Worthy 27 & 28.9, with 400 A. ipsilon (Ent.Gaz.22:42); West Tisted 9.10 (Sadler per B.Goater). SUSSEX E. Peacehaven 1 & 2.9; Brighton 26.9 (per French); East Dean 18/30.9, eleven (Ent.Gaz. 23:78), Cadborough (CRP Sx:314). KENT E. Worth 30.8 (ER 83:178); Lydd 19.9 (per French). SURREY. Tilford 19.9 (G.M. Haggett, pers. comm.); Rowledge 27.9, two (per French); Woking, n.d. (A.G.M. Batten, pers. comm.). GLOS N. Bisley, early 8 (Macrolep. Glos 3:158). SUFFOLK E. Sutton Hall 24.9 (Suff. N.H. 15:364); Needham Market, n.d. (Suff.N.H. 15:374). Walberswick, n.e.d. (French). NORFOLK E. Stalham 15.9 (per French). LINCS N., South Thorseby 5 & 6.9 (per French). CARDS. Aberystwyth 11.9 (per French). CAERNS. Talybont 11.9 (per French). YORKS v.c.63. Cusworth Oct.; Wakefield 11.10 (per French). YORKS v.c.64. Otley 30.9 (per French). INVERNESS E. Newtonmore 30.9 (ER 83:96). Co. ANTRIM. Lisburn (INJ 17:33).

Acherontia atropos (11) DEVON S. Slapton 9/12.9 (BENHS 4:11). DEVON N. Rackenford n.d. (per French). DORSET. Stalbridge mid 7 (per French); Arne 17.10 (DNHAS 92:41-51). SUFFOLK E. Wolverstone Hall 27.9 (Suff.N.H. 15:364). SUSSEX E. Polegate 11.6 (Ent.Gaz. 23:78). KENT E. Dungeness early June (per French). BUCKS. High Wycombe 6.10 (per French). NORTHANTS. Wellingborough 15.9 (per French). ANGLESEY Caneglyrd Sept. (per French). Co WICKLOW. Newcastle 24.10 (INJ 17:33).

**Lithosia quadra* (1) WESTMORLAND. Beetham 1.8; Arnside 1.8 (ER 82:274).

**Eurois occulta* (11). DERBYSHIRE. Chesterfield 7.7 (Derbs. ES: 210); Clay Cross 30.8 (BENHS 4:11). LANCS S. Nelson 30.8 (J. Briggs, pers. comm.). NORTHUMBERLD N. Kielder 24.8, 2.9 (per French). AYRSHIRE. Glenapp mid 9 (D. ffennell, pers. comm.). WEST Lothian Winchburgh 21.8 (E. Pelham-Clinton (pers. comm.)). PERTH S. Crieff and Rhynd early 9, two (D. ffennell, pers. comm.). ANGUS Invergowrie 24.8 (per French). ABERDEEN N. Forvie, 28.8 (ER 86:273). INVERNESS E. Newtonmore 31.7, pale form (ER 83:96).

Mythimna vitellina (3). CORNWALL W. Coverack, 29.8 (per French). SOMERSET S. Selworthy, 7.5 (per French). Co. KERRY. Dingle 8.6 (ER 82:314).

Mythimna unipuncta (14). SCILLY. St Mary's 15.10 (Ent.Gaz. 22:121). DEVON S. Slapton 28.9, two, 19.10, 31.10; Brixham, 5.10, 15.10 (per French). DORSET Swanage 18.10 (per French); Portland, 1.11 (DNHAS 92:49-51). ESSEX S. Bradwell-on-Sea 3.12 (Essex Guide:68). PEMBS. Dale 28.8, 14.9 (per French). Co. CORK Castletownshend 11.10, three (ER 83:24).

Mythimna loreyi (1). DEVON S. Colyford 14.10 (per French).

**Enargia paleacea* (1). ESSEX S. Little Baddow 6.8 (BENHS 5:116).

Spodoptera exigua (15). DEVON S. Slapton 8.6, 30.7, 2.8 (per French). HANTS S. Minstead 23.7 (ER 83:100). HANTS N. Martyr Worthy 12 & 13.10, three (Ent.Gaz. 22:42). SUSSEX E. Ringmer 11.10, two (Ent.Gaz. 23:2); Polegate, n.d. (CRP Sx:330). KENT E. Dungeness 24.9 (per French). DENBIGHS. Glan Conway, 7.7 (per French).

Helicoverpa armigera (4). SOMERSET N. Saltford 28.9, per French). HANTS S. Martyr Worthy 28.9, of light red form (Ent.Gaz. 22:42). ESSEX S. Bradwell-on-Sea 25.9 (per French). INVERNESS E. Newtonmore 15.10 (BENHS 4:11).

Trichoplusia ni (1). DORSET Weymouth 30.8 (BENHS 4:11).

**Deltote bankiana* (3). KENT E. Dungeness 14/16.9 (BENHS 4:11). ESSEX

S. Bradwell-on-Sea 21.6 (Essex Guide:88). SUFFOLK E. Walberswick n.d. (BENHS 4:11).

Catocala fraxini (1). HANTS N. Martyr Worthy (BENHS 4:89).

**Trisatele emortualis* (2). KENT E. Dungeness 26.6 (ER 82:271). ESSEX S. Bradwell-on-Sea 27.6 (Essex Guide:94).

1971

This was for the most part another poor year. Of the scarcer immigrants 26 species were reported, including six which are also resident; but the numbers of examples were small. Only *Rhodomestra sacraria* (c.27) and *Agrius convolvuli* (23) reached double figures. There were nonetheless some notable records. The second known British example of *Drepana curvatula* (Bork.) was trapped at Cley-next-Sea, Norfolk on August 19; a *Danaus plexippus* was seen in Cornwall in July; *Daphnis nerii* (L.) in Sussex in late June; *Lymantria dispar* L. in Essex on August 4; and *Enargia paleacea* and *Trisateles emortualis* not far apart on the same night, July 16, in Sussex, both probably coming as short distance migrants across the Channel. There was also a single *Lampides boeticus* in Surrey on September 4.

The usual immigrant butterflies were also few. *Colias croceus* was hardly reported; *Cynthia cardui* was scattered and scarce except for some influx to the Isle of Wight in early June; *Vanessa atalanta* became only fairly common and widespread during an immigration in August. Of the moths only *Autographa gamma*, with large influxes in mid August and September, was much above average numbers, and *Nomophila noctuella* was very common in some places near the south coast; all the others were in markedly below normal numbers, except possibly the diurnal *Macroglossa stellatarum*, of which in Ireland ten were recorded in Co. Dublin in July and August and one in Co. Down on October 23.

These poor results reflected rather numerous waves of immigration, several of them probably only coming from short distances across the Channel and southern North Sea, but generally consisting of small numbers both of species and individuals. A single *Papilio machaon bigenerata* Vty and a few *V. atalanta*, *C. cardui*, and *A. gamma* were noted about May 8, and there were more of these latter species in early June. Apart from a single *D. nerii* on June 29 there was little more until the short distance influx of mid-July which produced a conjunction of *E. paleacea*, *T. emortualis*, *Hyles gallii* Rott., *Orthonama obstipata* F. and more *V. atalanta*. The last days of July and early August brought a complex of singles of *P. machaon*, *Nymphalis antiopa*, *M. stellatarum*, *Spodoptera exigua* (Hüb.), *Lymantria dispar*, *Lithosia quadra* with a few *C. cardui* and *C. croceus*. From about August 16 onwards there followed what was probably the largest influx of the year, including *A. convolvuli*, *A. atropos*, *R. sacraria*, *O. obstipata*, several *Eurois occulta*, the single *D. curvatula* and vast numbers of *A. gamma*, of which in one locality 475 were trapped on the three nights August 19 to 21. There appear to have been further arrivals of some of these species at the end of the month and in early September, with the addition of two *Mythimna albipuncta* and the only *L. boeticus* of the year; and there was a rather similar influx from September 18 to 22. In October very few immigrant species were noted; the season closed in November with three widely scattered records of *Mythimna unipuncta*.

Scarce Immigrants, 1971

Palpita unionalis (1). ESSEX S. Southend-on-Sea 12.9 (ER 83:344).

**Papilio machaon* (1). KENT E. Sandwich Bay 8.5 (C-H Kent 3:212).

Colias hyale L. (3). CORNWALL W. Porthleven 10.10 (per French). KENT

E. Lydden Wood Sept., female (C-H Kent 3:212). ESSEX S. Southminster 17.8 (per French).

Lampides boeticus (1) SURREY Wisley Gardens 4.9, female (ER 83:326).

**Nymphalis polychloros* (1). DEVON S. Galmpton early Sept. (per French).

Nymphalis antiopa (2). DORSET Brownsea late July (DNHAS 93:42). ESSEX S. Ingatestone, 22.9 (Essex Guide:30).

Danaus plexippus (1). CORNWALL W. Carlyon Bay July, on cliffs (Miss M.E. Matthews per R.D. Penhallurick, *The Lizard*, 1975:24).

Drepana curvatula (1). NORFOLK E. Cley-next-Sea 19.8 (P.N. Kearney per de Worms, ER 84:79). Second British record.

Rhodometra sacraria (c.27). CORNWALL W. Polperro n.d.; Perranporth, n.d. (per French). DEVON S. Slapton 3.9, seven n.d. (per French). SOMERSET S. one, n.d. (per French). DORSET Furzebrook, 19.8; Stoborough 28.8, 8.10 (DNHAS 93:42-47). SUSSEX E. Peacehaven 2.9, 6.9, 4.10 (CRP Sx:308); Ringmer, n.d., two (per French). KENT E. Olantigh 19.8; Higham 20.8 (C-H Kent 3:200); Wye n.d. (per French). SURREY Wormley 3.9 (BENHS 4:99). ESSEX S. Bradwell-on-Sea n.d. (Essex Guide:102). GLOS. N. Bisley early 8 (Macrolep. Glos 3:161). LANCs N. Silverdale n.d. (per French).

Orthonama obstipata (8). DEVON S. Starcross, n.d. (per French). SUSSEX E. Ringmer n.d. (CRP Sx:309). KENT E. Dungeness 23.10, 24.10 (C-H Kent 3:266). WORCS. Pershore n.d. SALOP Preston Montfort n.d. CARMARTHENS. Gwenffyrdd n.d. YORKS. v.c. 61. Spurn Head n.d. (per French).

Agrius convolvuli (23). CORNWALL W. Porthcothan Bay 1.9 (per French). DEVON S. Starcross 17.8; Slapton 29.8, 30.8, 2.9, 12.10 (per French). HANTS N. Alton n.d. (S. Davey per B.Goater). SUSSEX W. Findon n.d. (CRP Sx:314). SUSSEX E. Peacehaven 1.9, 2.9 (CRP pers comm.); Icklesham n.d. (CRP Sx:314). ESSEX S. Bradwell-on-Sea 29.8, 14, 16, 20.10 (per French). PEMB. Abermawr 9.9 (Ent.Gaz. 23:14). LINC'S N. South Thoresby 2.9, 21.9 (R.M. Pilcher (pers comm.)). NORTHUMBERLD S. Cullercoats 24.8 (per French). WIGTONSHIRE Whithorn 27.8 (Ent.Gaz. 23:14). ORKNEY. Kirkwall, 30.8 (ER 84:192). Co. CORK Skibereen n.d. (INJ 18:356).

Acherontia atropos (3). DEVON N. Croyde Bay 18.8, 22.8 (per French). DURHAM Sunderland 25.8 (per French).

Daphnis nerii (1). SUSSEX E. Haywards Heath, 29.6 (CRP Sx:317).

Hyles gallii (2). KENT E. Sandwich 21.7 (BENHS 5:21). BUCKS. Chalfont St. Peter 2.9 (Ent.Gaz. 24:138).

Lymantria dispar (1). ESSEX S. Mayland 4.8 (Essex Guide:45).

**Lithosia quadra* (2). DORSET, Furzebrook, 26.7 (DNHAS 93:42-47). WORCS. Pershore, 5.8 (per French).

**Eurois occulta* (4). PERTH N. Trinafour 12/14.9, grey female (ER 84:129). ABERDEEN S. Ballater, 17.8, pale grey form (ER 86:273). BANFF. Aberlour, 19.8 (ER 88:8). ORKNEY. Scorradale, 24.8, pale (ER 88:191).

**Enargia paleacea* (1). SUSSEX E. Tilgate Forest 16.7 (ER 83:325).

Mythimna albipuncta (2). DEVON S. Slapton 29.8, 30.8 (per French).

Mythimna unipuncta (4). HANTS S. Martyr Worthy 18.11 (BG Hants:354). SURREY Thorpe Oct. (51:37). ESSEX S. Bradwell-on-Sea 5.11 (Essex Guide:68). NORFOLK E. Cley-next-Sea 11.11 (ER 84:79).

Spodoptera exigua KENT S. Dungeness 1.8 (C-H Kent 3:258).

Helicoverpa armigera (1). DORSET Charmouth 24.10 (ER 84:24).

Heliothis peltigera. KENT Dungeness 18.9, a few larvae (BENHS 5:29).

**Deltote bankiana* F. (1). MIDDx. North Harrow, June (BENHS 5:117).

Diachrysis orichalcea (1). KENT E. Gillingham 2.6 (C-H Kent:260).

**Trisateles emortualis* (1). SUSSEX E. Pease Pottage 16.7 (BENHS 4:95).

1972

This was a remarkable year. The season was very late and cold until well into July, with no great improvement later, and with northerly or eastern winds predominant almost throughout. Only 20 scarce immigrant species were reported, including six also resident; but they showed an unusual and distinctive pattern and content of species.

Little was seen of any immigrants before the last week of June, except for a curiously limited invasion of Kent and east Surrey by *Spodoptera exigua*, which probably came in from the east; these produced a second generation in September. In late June a small immigration from the south west brought in the only two *Heliothis peltigera* noted in the year and the first considerable numbers of *Autographa gamma*; but from mid July until the end of September there was a succession of arrivals from the north and east of Europe. Between July 14 and 27 no less than 17 *Hyles gallii* were reported, at first near the east coast from Essex to Lincolnshire, later widely across England, with one at Dingle in south west Ireland on July 21; a dozen larvae which presumably came from these were found well scattered in late August and early September. This influx appears to have been accompanied by small numbers of *Vanessa atalanta* and *Cynthia cardui*, by two *Enargia paleacea* and also by a dozen examples of the pyrale *Dioryctria abietella* which were noted in several places on July 21. Meteorological back-tracks of the *H. gallii* suggest that they may have originated in the southern Ukraine, where temperatures had been unusually high and rainfall lacking since early May.

There followed from July into early August another eastern invasion, probably from Fenno-Scandia or beyond. This yielded near the east coast a dozen *Syngrapha interrogationis* of the form common in Finland, and the second British record of *Ochroleura fennica* in Middlesex, as well as some *Eurois occulta*. Rather later a further influx, probably from central Europe, gave the second and third British records of *Apamea lateritia*, in Surrey on the night of August 17/18, another *O. fennica* at Newcastle on August 15, and probably a *Lithosia quadra* caught in Westmorland on August 20. During this period the usual movements from the south west were absent or very small, so that of *Agrius convolvuli* only one was reported, and of *Rhodometra sacraria* none at all. There was, however, a fairly clear cut immigration in the last days of October and in early November, which included two *Palpita unionalis*, several *M. vitellina* and a dozen *Mythimna unipuncta*, all near the south coast.

Of the common immigrant butterflies, *Colias croceus* was not reported at all. *V. atalanta* began early, with two records in March; but later arrivals in July and the first half of this and *C. cardui* were few and their numbers were apparently not much built up later by local breeding. The commoner immigrant moths were all much below normal numbers: several recorders commented that their totals for migrant species were the lowest they had ever noted.

Scarce Immigrants, 1972

Palpita unionalis (5). DEVON S. Torquay 26 & 28.10 (per French). DORSET Portland 7.10 (ER 84:288). HANTS S. Minstead 5.11 (ER 85:94). HANTS N. Martyr Worthy early 11 (per French).

**Dioryctria abietella* (13). SOMERSET S. Selworthy 20.7, three, July & Aug., four more (ER 85:155).

Cynthia virginiensis (1). DEVON S. Bishops Teignton 4.10, caught on buddleia (W.L. Coleridge, AES Bull. 32:38).

Nymphalis antiopa (5). HERTS. Welwyn c.21/25.9 (ER 84:285). STAFFS.

Blythe Bridge 2.9, on buddleia, remaining two days (Ent.Gaz. 84:299); Clifton Camperille 26.9 (per French). SALOP. Church Stretton 19.9 (per French). LEICS. Wigston Fields 1.9, female in garden watering can (Ent.Gaz. 84:299).

Danaus plexippus (1). DORSET Greenhill, (per French).

Orthonama obstipata (3). ESSEX S. Thundersley 1.10 (per French). SURREY Selsdon one n.d. (Croydon Survey: 310). YORKS. v.c. 63. Barnsley n.d. RISR.

Agrius convolvuli (1). WORCS. Harbury early 9 (ER 85:98).

Hyles gallii (18, plus 13 larvae): see detailed account in de Worms, ER 87: 232-239, to which should be added: SUSSEX W. Findon 18.7; SUSSEX E. Hastings autumn, one larva bred (CRP Sx:317).

Hippotion celerio (1). BUCKS. Amersham 15.8, larva (Ent.Gaz. 24:298).

**Lithosia quadra* (1). WESTMORLAND. Beetham 20.8, female (ER 84:290).

Ochropleura fennica (3). MIDDX. Shepperton 1 or 4.8, female in trap (L.A. Durden, Ent.Gaz. 25:51 and pers. comm.). 2nd British record. NOTTS. Mapperley 8.9. (M.E. Marchant, ER 90:248). NORTHUMB. S. Newcastle 15.8, female caught in the University building (I.D. Wallace, ER: 91:160).

**Eurois occulta* (5). SURREY Wormley 8.8, very worn female (J.L. Messenger pers. comm.). ESSEX S. Benfleet Aug.; Langdon Hills Aug. (Essex Guide: 60). WESTMORLAND Kendal Wood, 2.8, pale male (ER 84:251). CAITHNESS Lybster 21.7 (J.H. Rosie, pers. comm.).

**Mythimna lalburn* (2). ESSEX S. Bradwell-on-Sea two, n.d. (per French). The first Essex records, probably immigrant.

Mythimna vitellina (3). DEVON S. Slapton end Oct. (per French). SUSSEX E. Haywards Heath early Nov. (CRP Sx:324). PEMB. Dale Fort 30.10 (per French).

Mythimna unipuncta (14). DEVON S. Torquay 2 & 3.10; Slapton early 11 (per French). HANTS S. Wickham 2.11; Southsea 20.10; Portsmouth 30.10 (per French). SUSSEX W. Portslade n.d. (CRP Sx:325). ESSEX S. Bradwell-on-Sea 4.11, two (Essex Guide:68). SURREY Leigh 6.10 (ER 85:135). ISLE OF MAN Ballakagh Jan. 1972 (per French). ISLAY v.c. 102, 25.6 (R.E.M. Pilcher, pers comm.). Co. KERRY Dingle n.d. (ER 85:65).

**Enargia paleacea* (2). ESSEX S. Little Baddow 23.7, two (G.A. Pyman, BENHS 5:139).

Apamea lateritia (2). SURREY. West Norwood 17.10, in trap in strong north east wind (B.F. Skinner, BENHS 5:144); Bexley 17/18.10, identified but escaped (D.O'Keeffe, ER 84:289). 2nd and 3rd British records.

Spodoptera exigua (23). KENT E. Boulderwell 14/28.6 (11), 3/17.9 (9) (C-H Kent 3:258). KENT W. East Malling 25.6, 1.7 (Rothamsted Insect Survey). SURREY North Cheam 21.7. (Croydon Survey:393).

Heliothis peltigera (2). SUSSEX E. Brighton 25.6, two (per French).

**Syngrapha interrogationis* (11). KENT W. Gravesend 4.8 (C-H Kent:261). ESSEX S. Bradwell-on-Sea 30.7 (Essex Guide:92). NORFOLK E. Wells-by-Sea 1.8 (Kerney per de Worms, pers comm.); Salthouse 28.7 two, 31.7 (ER 86:251). LINCS N. South Thoresby 29.7 two, 31.7, not of the British race (ER 84:250). YORKS v.c.62. Wykeham 31.7 (per French). ORKNEY Orphir 31.7 (Ent.Gaz. 28:25).

[to be continued]

OBITUARY

J.L. MESSENGER

With the death of J.L. ("Bobbie") Messenger on 24th May 1982, at the age of 80, the Society lost a long-standing and much valued member. He was elected in 1951, first served on Council in 1958, and was President in 1963, after which he was largely responsible for finding our present rooms at the Alpine Club; he was a member of the Finance Committee for many years, and a Trustee from 1966 until his death. He was also a Fellow of the Royal Entomological Society from 1952, and served much on their Council.

Educated at Charterhouse and Oxford, Bobbie collected Lepidoptera from his school days onwards, at first mainly round his mother's home at Oatlands, Weybridge. During the war he served for several years in Ceylon, and he then made an interesting collection of butterflies and moths there, some of which he later exhibited to the Society as examples of mimicry. In the fifties he contributed much to the making of the list of macrolepidoptera and pyralidina of north-west Surrey (Proceedings, 1955), which until then were little recorded. In 1959 he moved to a house at Wormley, above the Surrey Weald, where his light trap yielded a surprising number of the rarer immigrant moths. Through the years he also collected in many other parts of Britain and Ireland, and with his friend Baron de Worms was the first to find the Pug *Eupithecia phoeniceata* Rambur in Cornwall. His British collection, immaculately set, has been presented to the Society by his brother, Mr. W. Messenger and the Sri Lankan butterflies to the Brooke Museum, Brighton.

Among his other interests, Bobbie had a good working knowledge of mediaeval church architecture, and he also built up a notable collection of the classical issues of stamps of certain West Indian islands.

R.F.B.

BOOK REVIEW

Large White Butterfly. The Biology, Biochemistry and Physiology of *Pieris brassicae* (Linnaeus), by John Feltwell. 535 pp., 10 monochrome plates, 80 tables, 49 text figures. Dr. W. Junk Publishers, Hague. 1982.

Dr. Feltwell cites over 4,000 references, on all aspects of the biology of the butterfly *Pieris brassicae*, and gives an indication, albeit brief, of their contents. He has undoubtedly rendered a great service to anyone wishing to study this species. Further as many of the techniques and systems outlined will have relevance to other species of Lepidoptera (or indeed other orders of insects) the book should be useful to all students of lepidopterology.

This is a book to use as a reference work rather than to be read from cover to cover. In this context the style is factual and laudably concise, the length of the book being due to the tremendous amount of information it encompasses. The layout is very clear and the tables of contents and indexes are in the main exhaustive and helpful, although they suffer from one or two rather unfortunate errors, such as the page numbers of all the headings for chapters 7 and 8 being incorrectly listed in the contents. There are a number of very useful review tables which enable quick and easy retrieval of information; and lists of references cited are sensibly put at the end of each chapter. Unfortunately there are a number of mistakes in the reference lists which, while generally minor, are rather a shame in what is first and foremost a literature review.

The coverage of the various subjects relating to the biology of *P. brassicae*, is excellent throughout. Although there is a bias in the text towards biochemical and pigmentary studies compared with, for example, the field ecology of the species, this appears to be due to the wide use of *P. brassicae* as an easily cultured

laboratory insect rather than a bias on the part of the author. Throughout the book Dr. Feltwell constructively points out areas where more work is needed.

As a whole the book is well produced and has a nice feel. It will surely become the definitive work on *P. brassicae* and lead the way for other similar compilations which are greatly needed and will hopefully follow. However, at £40.00 and with the rather dry narrative style of the text, I suspect it will find its way into more libraries than private homes. But then the scientific library, from whence its contents have come, is surely its rightful home.

M.E.N.M.

INDOOR MEETINGS

BENHS Meeting 11.iii.1982.—The President, Mr. J. HEATH announced the death of a life member, Dr. Dennis Leston, in Florida in October 1981.

Exhibits: Col. EMMET exhibited the following donation to the Society. The Report on the Cambridge Butterfly Expedition to Central America, 1979, by Chris Thomas and Mark Cheverton, which expedition was supported by an award from the Prof. Hering Memorial Research Fund. Mr. S.N.A. JACOBS, a drawer from a 20 drawer insect cabinet which he was offering for sale, the proceeds to be given to the Society. Mr. G. PRIOR, two living examples of the pug *Eupithecia assimolata* Doubl., recently hatched from inbred stock. The Rev. D. AGASSIZ, a flea preserved in spirit and an enlarged photograph of the same.

Communications: Mr. R.F. BRETHERTON asked anyone who might be visiting the Scilly Isles this spring to look out for *Danaus plexippus* L., and if it was seen, kindly to let him know.

Lecture: *Larval colour variation in British Lepidoptera* by Dr. M.E.N. Majerus.

BENHS Meeting 25.iii.1982.—**Membership:** The President announced the death of Mr. C.H. Dixon. Dr. A.V. Aalto, Mrs. M.A. French, Messrs. R.L. Gabriel, H.S. Papworth and T.J. Vaughan were elected members.

Exhibits: Dr. A.J. HALSTEAD: an egg mass of the rose root aphid, *Maculolachna submacula* Walker (Hem: Lachnidae) on the stem of a garden rose from the Royal Horticultural Society's Garden, Wisley, Surrey. The aphid is dark brown and comparatively large but is seldom seen as it spends most of the summer sucking sap from the roots of roses. In late autumn, females climb up the stems and lay dense clusters of eggs. Heavy infestations may weaken the rose but usually the only indication that the aphid is present is the discovery of the egg masses. The eggs hatch in April and the young aphids go down into the soil. Mr. R.F. BRETHERTON: photographs of *Danaus plexippus* (L.) by E. Rayner per B. Wildridge probably taken at Church Norton above Pagham Harbour, Sussex, 10.x.1981. Mr. D.E. WILSON: various larval stages of *Zygaena viciae* ssp. *argyllensis* Trem., being larvae in diapause, post diapause and fully grown; two cocoons of *argyllensis* on grass found after emergence, and adults of both ssp. *argyllensis* and ssp. *anglica* Reiss for comparison; the New Forest specimens are dated vii.1912, coll. S.F.P. Blyth.

Communications: In Mr. R.F. BRETHERTON's light trap at Bramley, Surrey on 22nd March there were 96 moths of 9 spp. (temperature 6°C falling to -4°C); on 24.iii, to 11 p.m. only, there were 56 moths of 6 spp. (temperature 3°C falling to -2°C), both clear nights after sunshine. Dr. I. McLean had taken *Bombus lucorum* (L.) and *B. pratorum* (L.) in London recently.

Lecture: *The British species of Argyresthia*, by Rev. D.J.L. Agassiz.

BENHS Meeting 22.iv.1982.—The President announced the death of an honorary member, Mr. F. Stanley-Smith.

Exhibits: Lt. Col. EMMET (1) a specimen of *Phyllonorycter saportella* (Dup.) reared from a mine on oak collected at Lopham, Norfolk on 8.xi.1981; the adult emerged indoors on 26.iii.82. This is the first British specimen taken in any form since 1949, when E.C. Pelham-Clinton found two on the trunks of oak in Cambridgeshire. The present capture was fortuitous, since the mine happened to be on the same leaf as a cocoon of *Caloptilia robustella* Jäckh for which the leaf was collected. The mine was on a lobe and internal spinning caused the leaf edge to curl right over so as almost to conceal the mine. This characteristic, which renders the mine very inconspicuous, is more likely to be the reason why it has not been found in recent years than the popular supposition that the larva feeds only high up on the oaks. (2) a book on conservation of butterflies in Germany by J. Blab & O. Kudrna entitled *Hilfsprogramm für Schmetterlinge* (see review). Mr. R. FAIRCLOUGH: Four live specimens of *Adela cuprella* D. & S., caught today at Chobham, Surrey at about 15 ft. round willow bushes. Mr. R.F. BRETHERTON: Distribution maps of *Danaus plexippus* (L.) and *Cynthia cardui* (L.) in Gt. Britain in 1981 and 1980 respectively. Mr. M. HADLEY: A Report of Rewell Wood, W. Sussex, published in 1981 and compiled by E.C.M. Haes and others, treating of various entomological and non-entomological disciplines. He also drew attention to the fact that he was compiling a paper on the flora and fauna of shingle at the 'Crumbles', Eastbourne, and requested entomologists for their recollections of collecting there, since this once unique area is now doomed to destruction.

Announcements: The President announced that copies had been prepared by Mr. B. Ashby of the catalogue of the Stig Torstenius collection.

Communications: Col. EMMET said that Col. Carter had taken a specimen of *Eucosma pauperana* (Dup.) at Fleam Dyke, Cambs. on 20th April. Mr. BRETHERTON said that at Bramley, Surrey on April 21st there were 150 moths in his trap including two *Odontotia carmelita* (Esp.).

Lecture: *The ecology of Red Ants*, by Dr. G.W. Elmes.

BENHS Meeting 13.v.1982.—**Exhibits:** Mr. R.F. BRETHERTON: A female *Vanessa indica* (Herbst) taken on flowers of *Hebe* by Mr. Keith Turner in his garden at Kites Hardwick, Warwickshire either in September 1973 or on 20.viii.1974 but only recently identified. Believed to be the first record of this species from Britain it appears to be *Vanessa indica indica* from the Far East and not *V. indica calliroe* Hübner from the Canary Islands and Madeira. Lt. Col. A.M. EMMET: two larvae, possibly of *Crombrugghia distans* (Zeller) taken on *Crepis capillaris* at Barton Mills, Suffolk on 2.v.1982. These larvae differ from the description of *C. distans* given by Beirne and may therefore be of *C. laetus* (Zeller) a species formerly confused with *C. distans*. Four more larvae were taken at the same locality on 9 May and another four on 11 May. One was fixed for pupation and pupated the next day. Mr. P. JEWESS exhibited a fifth instar larva of *Gortyna borellii lunata* Freyer feeding on a french bean/agar based artificial diet. The success rate of rearing this species from eggs on artificial diet has been far greater than on carrot or parsnip root.

Membership: Messrs. M.L. Gascoigne-Pees and C.L. Chan were elected.

Announcements: The President announced a request from D.W. Wrase of Berlin to exchange Coleoptera and correspond with members.

Communications: Mr. R.F. BRETHERTON noted that light-trap attendances at Bramley, Surrey were very poor from 1 May to 10 May and then with the sudden change to a warm night on 12/13 May, 62 moths of 23 species were recorded, some of which were very late in appearance. Mr. B. ASHBY presented

the catalogue of the Torstenius collection.

Lecture: Hunting spiders in Kenya, by Mrs. F. Murphy.

BENHS Meeting 27.v.1982.—*Membership:* The deaths of Messrs. J.L. Messenger and R.W. Watson were announced. Messrs. A. Braddock, M.J. Collier, M.P. James and P.D. Whitehead and Miss P.S. Butler were elected members.

Exhibits: Mr. P.A. SOKOLOFF: a pupa of the Stag Beetle, *Lucanus cervus*, reared from a larva collected from an oak post in Bromley, Kent, 18 months ago. Mr. B.R. BAKER: a plume moth, *Platyptilia gonodactyla* (D. & S.), found this evening on a wall opposite Apsley House in central London. The larva feeds on Coltsfoot. Lt. Col. A.M. EMMET: (1) five pupae and a larva of the *Crombrugghia* sp. (Pterophoridae) that was exhibited on 13th May from Barton Mills, Suffolk. The original description of the larvae of *C. distans* (Zell.) was made by Hofman in *Die deutschen Pterophorinen* (1895): the Suffolk larvae differ from this in almost every particular. The pupae differ from the description of *C. laetus* given by Tutt. It is therefore evident that either the larvae were incorrectly described or that the supposed British *C. distans* belong to another closely related species. (2) A living adult of *Adela croesella* (Scop.) reared from a case-bearing larva taken at Icklingham, Suffolk on 2.xi.81 and exhibited on 12th November.

Communications: Mr. R.F. BRETHERTON noted that light trap catches at Bramley, Surrey had undergone a sudden change. On the evening of 20th May conditions were clear and cool with only 70 moths of 20 species in the trap. The following night, with the wind now coming from the south-west some 300 moths of 56 species were recorded, over 100 being *Ochropleura plecta* (L.).

Lecture: Beetle diversity and land use, by Dr. C. Terrell-Nield.

BENHS Meeting 10.vi.1982.—*Exhibits.* Mr. A.J. HALSTEAD: final instar larvae of the Brindled Beauty *Lycia hirtaria* Clerk, given to the exhibitor by an employee of the Chertsey Post Office, Surrey, where the larvae were said to have completely defoliated a 20ft pollarded lime tree. Mr. HADLEY: (1) live specimens of the Cistus Forester *Adscita geryon* (Hübner), taken from a colony over 200 strong at a site in West Sussex. The gravid females were ovipositing and it was hoped to rear the larvae. The habitat for this species approximates to that of the Scarce Forester *A. globulariae* (Hübner), which was also present although in much smaller numbers. (2) Live adults of *Aplodia interpunctella* (Hübner), collected from a dried fruit store in Kent in July 1981. The larvae remained in a torpid fully grown state throughout the winter pupating in late May 1982 and subsequently emerging. The larvae were reared on 'Valuemix' a dried petfood for dogs and ideal substrate for many pest larvae.

Communications:—Mr. R.S. TUBBS noted on a visit to Tugley and Fisherlane Woods on May 22nd that the oaks had been defoliated. He suspected the culprit might be *Tortrix viridana* (L.). Mr. R.F. BRETHERTON commented that in nearby Hog Wood a similar thing had happened and that larvae of *T. viridana* starved of their foodplant had successfully finished on nearby nettles.

Mr. R.F. BRETHERTON noted some 500 moths of 102 species at his Bramley (Surrey) trap on the evening of the 7.vi.1982: over 200 were *Agrotis exclamatoris* (L.). Mr. A.J. HALSTEAD noted that on the evening of 2.v.1982 a male December moth, *Poecilocampa populi* (L.), was taken at light in the R.H.S. gardens at Wisley, Surrey. Mr. R. HILLIARD noted the occurrence of *Autographa gamma* Linn., over twenty specimens at Ashridge, Tring. Mr. R.A. SOFTLY noted the presence of *Vanessa atalanta* and *Cynthia cardui* at Hampstead over the past few days. He commented that *Epirrhoe alternata* (Müller), although suspected as a bivoltine species in the area, when reared from stock obtained in spring 1981 did not emerge until spring 1982. He also noted the emergence of an adult

Zygaena lonicerae Schev., after diapause through three winters.

Mr. E.S. BRADFORD noted that he had bred specimens of *Sphinx ligustri* Linn., and *Smerinthus ocellata* Linn., from a heap of compost as well as finding a Dormouse on the same heap. Mr. K.G.M. BOND, a member from Ireland, noted that *V. atalanta* was seen South of Cork on Easter Monday.

Col. A.M. EMMET related an anecdote about 'beginners luck'. At a recent Essex Field Meeting, a youth of 18 with only a recent interest in the hobby had netted a specimen of *Ethmia funerella* (F.), a species new to Essex. Within a box of specimens presented to Col. EMMET was a specimen of *Lampronia fuscata* Tengstrom, a second species new to Essex.

Lecture. The sexual behaviour of Fruitflies (Drosophilidae), by Dr. R. Lee.

BENHS Meeting 24.vi.1982.—*Exhibits.* Rev. D.J.L. AGASSIZ exhibited a Norwegian specimen of *Plutella haasi* Staud., a species which has recently been added to the British list. The only known British specimen was taken on mountains in N.W. Scotland, by the late Canon G.A.K. Hervey. Dr. D. LONSDALE: a specimen of *Rhagium mordax* found in Alice Holt Forest on 11.6.82. This is a cerambycid which is perhaps less common than in the past.

Members elected. Paul Robert Griffiths and Raymond Norman Pillinger.

Communications. Rev. AGASSIZ reported that a humming-bird hawk moth had been seen in a neighbour's house at Grays, Essex. The PRESIDENT read an announcement from the British Museum (Natural History) concerning the donation of a collection of 2700 butterflies from Sir Cyril Clarke.

Lecture. The Role of invertebrates in the survival of Britain's reptiles by Dr. I.F. Spellerberg.

BENHS Field Meeting: Pewley Down, Guildford, Surrey, 22.v.1982. Leader: R.F. Bretherton.—After a forbidding early morning, which improved later only enough to give gleams of sunshine in a strong south-west wind, only seven members attended: one was on a visit from France and another a welcome expert on the sawflies. The local colony of the Blue, *Cupido minimus* (Fuessly) was in good order, with a few of both sexes seen flying or at rest; but only six other species of common butterflies were noted. Diurnal moths were also hard to move, *Euclidia glyphica* (L.) being numerous, with examples of the Tortricids *Epiblema scutulana* (D. & S.) and *Ancylis unculana* (Haw.).

HYMENOPTERA: *Pamphilus sylvaticus* L., *Cephus cultratus* Eversmann, *Arge ustulata* (L.), *Allantus cingulatus* (Scop.), *Blennocampa pusilla* (Klug), *Aglaostigma fulvipes* (Scop.), *Tenthredopsis litterata* (Geof.), *Rhogogaster viridis* (L.), *Tenthredo arcuata* Forster, *T. celtica* Benson, *T. livida* L., *Pachyprotasis rapae* (L.), *Macrophya albicincta* (Schränk), *M. montana* (Scop.), *M. punctumalbum* (L.). **DIPTERA:** *Chrysotoxum cautum* (Harris). **HEMIPTERA:** *Centrotus cornutus* (L.).

The party broke up about 3.30 p.m., and some members adjourned to the leader's house for tea and discussion.

BENHS Field Meeting: Beaulieu River, New Forest, 3/4.vii.1982. Leader: Col. D.H. Sterling.—The meeting, which was arranged east of Ashurst/Lyndhurst Rd. to provide records for the NCC invertebrate survey of the New Forest, was attended by 8 members and visitors. We were particularly pleased to welcome as a visitor Mr. Simon Davey, Keeper of Biology for the Hampshire County Museum Service. The weather was far from ideal, the day work being hampered by showers of heavy stormy rain which cleared at sunset, leaving the night cool and clear.

Most members requiring *Crambus uliginosellus* Zell. obtained a number of specimens from the wetter parts of the bog and elsewhere a few *Capperia britanniodactyla* (Gregson) and *Eustrotia uncula* (Clerck) were taken. Seven species of *Argyresthia* were found, including *ivella* (Haw.), *arcella* (F.) and *glauzinella* Zell. The most interesting visitor to light was a single female *Heterogenea asella* (D. & S.). 130 species of Lepidoptera were recorded. Diptera and ants were also studied and a number of specimens of other Orders were taken by Mr. Davey for subsequent determination.

BENHS Field Meeting: Monmouth, 23-29.v.1982. Leaders: E.C. Pelham-Clinton and A.E. Stubbs.—Eight members attended a residential field meeting based at Caer Llan Field Studies Centre, situated on the wooded hillside 2 miles SW of Monmouth. A member from Herefordshire joined us on one of our day trips.

We were treated to excellent hospitality by Peter Carpenter and his staff at Caer Llan. The lecture room was soon transformed into a work area with benches, our lamps and microscopes giving a settled-in appearance which made parting all the more difficult. The spacious grounds had plenty of entomological interest and the adjoining woods were of good quality. Our situation afforded a marvellous outlook across Gwent to the Brecon Beacons.

The large house was soon festooned with electric cables radiating from bedroom windows to supply four MV traps. There was a steady increment in our lists, with one warm night giving a bumper catch. Including some collected by day and at dusk in our surroundings, the Lepidoptera list rose to 161 species (macros plus micros). Greatest excitement centred around the capture of two *Egira conspiciaris* (L.) (Silver Cloud), a local speciality, plus a *Lacanobia biren* (Goeze) (Glaucous Shears) and *Harpyia bicuspis* (Bork.) (Alder Kitten). Diptera included the very scarce craneflies *Tipula selene* Mg. and *T. truncorum* Mg. and the dead wood hoverfly *Criorhina ranunculi* (Panzer). Close interest was shown in the presence of a wine cellar, in which the scarce spider *Meta menardi* (Latr.) was located with its egg sacs — during the week rather more space was made available for these spiders!

Many of our forays were into the woods along the Wye Valley. On a particularly warm night two traps were run at Wynd Cliff until 1.30 am, yielding 100 species of moths, an exceptional number so early in the season. The catch included *Harpyia bicuspis*, *Pammene herrichiana* (Hein.), *Tetheella fluctuosa* (Hübner) (Satin Carpet) and *Eupithecia egenaria* H.-S. (Pauper Pug). A day trip here for other orders produced the cranefly *Tipula alpina* Lw. and the hoverflies *Criorhina ranunculi*, *Brachypalpus bimaculatus* (Mcq.) and *Volucella inflata* (F.). A larva of *Deileptenia ribeata* (Clerk) (Satin Carpet) was beaten out of yew during an unsuccessful hunt for the spider *Hyptiotes paradoxus* (Koch). The spider *Araneus ceropegius* (Walck.), only recorded from nearby Piercefield in 1853, failed to materialise on a likely marsh by the River Wye at Wynd Cliff, but a male *Xysticus ulmi* (Hahn) appeared as partial compensation.

At Barbados Hill near Tintern the Lepidoptera were doing reasonably well where deciduous woodland had been retained by the Forestry Commission, including *Phyllonorycter muelleriella* (Zell.), *Lampronia luzella* (Hübner), *Minoa murinata* (Scop.) (Drab Looper) and larvae of *Coleophora lithargyrinella* Zell. and *Elachista regificella* Sircom. At Bigsweir a specimen of the rare cranefly *Ctenophora atrata* (L.) conveniently settled on the road by our parked cars on the Gwent side of the river, while in the fields and woods south east of the bridge, on the Gloucestershire bank, *Coleophora lithargyrinella* was found. The woods here yielded a male of the rare cranefly *Tipula nubeculosa* Mg. among a rich and interesting fauna of Diptera, and the scarce cranefly *Scleroprocta pentagonalis* (Loew) was beside a stream in the fields.

Further north up the Wye, attention was paid to the Lords Wood area, including some Herefordshire Naturalists' Trust reserves. Micro-moths included *Anania funebris* (Ström), *Eucosma aemulana* (Schläger), *Telephila schmidtii* (Heyden) (larvae in folded leaves of *Origanum*), *Mompha langiella* (Hübner), *Digitivalva perlepidella* (Staint.) and *Eucosma aspidiscana* (Hübner). A search of *Mycelis muralis* produced no positive indication of the presence of *Pselnophorus heterodactyla* (Müll.). Among the Diptera was the crane fly *Tipula alpina*. Nearby, at Symmonds Yat East *Mompha langiella* and *Lampronia luzella* were again found.

The Wye Valley was as memorable for its less rare insects. *Cepphis advenaria* (Hübner) (Little Thorn) seemed to occur in most woods, almost certainly using the local bramble (a relatively benign form) as a food plant. Handsome cardinal beetles were seen regularly, both *Pyrochroa coccinea* (L.) and *P. serraticornis* (Scop.). The large lacewing *Osmylus fulvicephalus* (Scop.) was found by several streams. The river produced a profusion of mayflies, great numbers of large *Ephemera danica* Müll. being a marvellous sight together with the damselfly *Agria splendens*. The river banks yielded an interesting fauna of Diptera including *Atherix ibis* (F.), *Tipula couckeii* Ton., *Tipula montium* Egger, *Erioptera areolata* Siebke and *Molophilus propinquus* (Egger). One unexpected find was several full grown larvae of *Callimorpha dominula* (L.) (Scarlet Tiger) at a spot near Tintern.

Cannop Ponds and the surrounding woodlands in the centre of the Forest of Dean produced a very different fauna, being on the Coal Measures rather than the Carboniferous Limestone and Devonian rocks of the Wye Valley. Here we were pleased to find several *Rheumaptera hastata hastata* (L.) (Argent and Sable) flying and larvae of *Mompha locupletella* (D. & S.) on *Epilobium*. The dead wood crane flies *Ctenophora atrata* and *C. pectinicornis* (L.) were found as well as a rich Diptera fauna in the marsh and carr by the lake. A specimen of the rare spider *Tetragnatha nigrita* Lendl was swept from *Phragmites*.

Several forays were made outside the confines of the Forest of Dean. Magor Marsh, a Gwent Naturalists' Trust reserve, produced *Elachista poae* Staint., *Mompha locupletella*, the hoverfly *Anasimyia transfuga* (L.) and the harvestman *Lacinius ephippiatus* (Koch.). A visit to the nearby saltings at Magor Pill by three of the party resulted in a record of the woodlouse *Armadillium nasatum* and in the lane nearby the feedings and several mines and a case on sloe of *Coleophora prunifoliae* Doets or *C. cerasivorella* Packard (not reared). In Herefordshire, Queen's Wood near Linton had various interesting moths including *Panemeria tenebrata* (Scop.) (Small Yellow Underwing) and larvae of *Caryocolum blandella* (Dougl.) on *Stellaria holostea*. Various other localities were visited, such as marshes near Trelleck.

The week went all too quickly, a good indication that we enjoyed our stay. Some were fortunate to head deep into Wales for another week's foray whilst a party heading for London managed to break their journey at Crickley Hill near Gloucester to discover on *Inula conyzia* the presence of the micro-moths *Digitivalva perlepidella* (Staint.), *Coleophora conyzae* Zell., *Leioptilus carphodactyla* (Hübner) and the fly *Phytomyza conyzae* Hendel. Our thanks are passed to the Forestry Commission for a collecting permit and to Gwent Naturalists' Trust and Herefordshire Naturalists' Trust for access to their reserves. Our special thanks go to our hosts at Caer Llan for adding so much to the pleasure of our stay. One of our members will not readily forget his surprise birthday cake with eight candles, — it is believed this reflects the size of the party, not his age!



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